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THE PHYSIOLOGY OF THE LIVER.*

By FRANK C. MANN, M. D., Rochester, Minnesota.
Division of Experimental Surgery and Pathology, The Mayo Foundation.

The functions of the liver are too numerous, too varied, and too important to attempt a comprehensive discussion of them in a single paper, and rather than present an incomplete general review of the physiology of this great organ, I shall discuss those phases of its function which appear to be of the most importance to clinical medicine, and also those which bear some relation to the phases to be discussed in this symposium.

In order to appreciate fully the functional significance of the liver a few facts concerning its anatomy are essential. One of the most important anatomic considerations is its double blood supply, arterial and venous. Arterial blood enters the liver under the pressure in the arterial system and the outflow through the gland is under the control of the intrahepatic vasomotor system; this portion of the hepatic blood supply is similar to that of other organs. On the other hand, the blood entering the liver through the portal vein is under low pressure, as found in the venous system, and the amount is controlled mainly by the vasomotor mechanism of the vascular areas forming the portal system. The liver is unique among organs in that the control of by far the largest amount of blood flowing through it resides in a vascular area outside the organ.

Another anatomic detail of the liver which is of great physiologic significance is the organization of the unit of the liver on a dual basis. The duct system is emphasized from one standpoint, while the minutia of its circulation is emphasized from another standpoint. However, anatomically the latter appears the more important, which suggests that, for the most part, the activity of the liver is associated with an exchange of substances carried to the organ and discharged from it into the blood.

The liver should also be considered anatomically and physiologically as composed of two organs. The cellular component of the liver which is responsible for most of its specific activities is the hepatic cell. This characteristic histologic unit is not found elsewhere in the body and on it depend the manifold functions of the liver with regard to the secretion of the bile, the specific activities of the organ in various phases of metabolism, and so forth. On the other hand, partially lining the blood spaces surrounding the trabeculae of hepatic cells are other characteristic cells, the so-called stellate cells, which have entirely different functions from the hepatic cells and are seemingly similar to cells found in other organs such as the spleen and the bone marrow. The stellate cells function as macrophages and are thus of importance in removing foreign material from the blood stream and in many other similar activities.

The function of the liver which thus far has apparently played the principal role in clinical medicine is secretion of bile, because of the relation of this product of the liver to many clinical conditions, such as jaundice and disease of the biliary apparatus. However, it is probable that other functions are really of more clinical significance, although present knowledge concerning them is too limited to determine this point.

Among the many constituents of the bile three are outstanding, namely, the bile salts, cholesterol and bilirubin. Data concerning the relation of the two former substances to hepatic function are very incomplete. Evidence seems to show that the bile acids are made in the liver, although this has not been proved. Neither are the substances from which the acids are made definitely known, nor if they are of more physiologic importance than as an agent to digest fat. In this connection it should be noted that the bile salts are the only true cholagogues. Definite facts concerning the role of the liver in cholesterol metabolism are too few to warrant this discussion, and this point, as well as others on the subject, awaits further investigation.

Considerably more is known of bilirubin than of the other important constituents of the

*Read by invitation as part of the symposium on The Liver before the fifty-seventh annual meeting of the Medical Society of Virginia, at Norfolk, October 12-15, 1926.

bile. In the past it was generally accepted that this pigment is made in the liver, but it has been proved that while a small amount forms in the liver, most of it forms in the bone marrow and spleen. It is probable that the hepatic cell does not make bilirubin but is only the agent in its excretion from the blood. It is obvious that this conception of the function of the liver in relation to this important constituent of bile is of great significance with regard to the clinical conditions of jaundice.

As our knowledge of carbohydrate metabolism has advanced since the discovery of glycogen and its storage in the liver, so the physiologic importance of the liver has advanced. The higher forms of organisms, such as man, require a readily available source of energy which will permit a wide and varying range of intensity of physiologic activity. The food to supply such energy must be naturally abundant, easily assimilated, readily stored in the body as well as readily transported to the tissues, and when utilized, must yield energy for the work of the cells and the production of heat, with a minimum of easily and quickly eliminated combustion by-products. Carbohydrates admirably fill these requirements. They are the most common of foodstuffs and are readily obtained. In general they are easily digested. They are absorbed in the form of glucose, which is carried by the blood to the tissues where it is burned, producing energy for work and heat. Of waste products the residue of the combustion, water and carbon dioxid, are the most easily eliminated; in the form of glycogen it can be stored in the liver and muscles.

However, the needs of the organism for this source of energy vary greatly, depending on whether the body is at rest or undergoing physical exertion. Many times more glucose is needed in the latter condition than in the former. If there were no means of regulating the amount of glucose reaching the tissues, the supply would fluctuate greatly, depending on the state of bodily activity, ingestion, and so forth, and there would be plethora during the time of absorption from the alimentary tract and deficiency between periods of feeding. During physical exertion the supply might be exhausted, and at rest the organism might be flooded with glucose; in the latter condition much of the glucose would be lost in the urine. It can readily be understood that in order to insure an available supply of glucose to the tissues at all times under the varying conditions of ingestion and utilization, a regulatory mechanism is absolutely essential. The liver is the organ which maintains this regulatory mechanism.

The importance of the liver in maintaining the concentration of sugar in the blood has been determined by a study of the effect of its removal on the the blood-sugar level. Immediately after removal of the liver the blood-sugar level begins to lower progressively. When it reaches a certain rather definite level a characteristic, definite group of symptoms appears; they usually occur in an order which parallels the decrease in concentration of sugar in the blood. If glucose is injected in proper amounts when the animal is moribund and the blood sugar is low, the animal immediately becomes normal. If glucose is administered before the blood sugar has decreased to a low level, the characteristic symptoms associated with the hypoglycemia do not appear. These results prove that the liver maintains the normal blood-sugar level, that a certain concentration of glucose in the blood is essential to life, and that by the proper administration of glucose a rough approximation can be made of the activity of the liver in maintaining the blood-sugar level.

The liver not only is essential for the maintenance of the normal blood-sugar level, but it is also responsible for all the increase other than that due to the ingestion of carbohydrate. For instance, when the pancreas is removed from a dog, the blood sugar increases and the animal becomes diabetic. If the liver is removed when the blood sugar is high following pancreatectomy, it immediately decreases and the usual hypoglycemic symptoms appear, but this occurs at a higher blood-sugar level than in the normal animal. In the normal animal, whose liver contains glycogen, some procedures, such as asphyxia, anesthesia and the administration of certain drugs, such as epinephrin, will cause transitory hyperglycemia. This increase in blood sugar will not occur after the liver has been removed.

The amount of glycogen in the body of the normal animal is about equally distributed in the liver and muscles. When the liver is removed, the glycogen of the muscle decreases but the animal will die in a condition of hypoglycemia, while if the glycogen in the muscles were available to maintain the sugar in the blood, life would be sustained for a consider-

able period. No evidence has been obtained to show that the glycogen of the muscle is utilized for maintaining the blood-sugar level and if any is thus utilized, it is entirely inadequate to keep the blood sugar at the necessary level.

While the importance of the liver in regulating the concentration of sugar in the blood has been amply proved, the mechanism involved is not known. One of the most interesting unsolved problems in relation to the physiology of the liver is the manner in which it maintains the level of blood sugar so constantly within narrow limits.

Since the liver has such a responsible position in maintaining the blood-sugar level, it is not surprising to find that it also has a very important function in protein metabolism, particularly with that portion of the ingested protein which is utilized as carbohydrate. Only a part of the protein food ingested is used as such, and the remaining portion must be utilized otherwise. Most of the latter portion is deaminized, the nitrogenous by-product excreted as urea, and the remaining protein converted to glucose. The liver is essential for this process and the blood-sugar level is maintained, in the absence of available carbohydrate, by making glucose from protein. The fact that the liver is necessary for the formation of urea has been demonstrated in many ways but most conclusively by a study of the nitrogenous constituents of the blood and urine of an animal whose liver has been removed. If the liver and kidneys are removed from a dog simultaneously, the urea content of the blood remains the same or falls slightly below its preoperative level. The decrease is due to the loss of urea in saliva and other secretions of the alimentary tract. If the secretion of urine is maintained after removal of the liver, the amount of urea in the blood, tissues and urine decreases and the animal may become almost urea free. If the kidneys are removed, and some time later, after the blood urea has greatly increased due to retention, the liver is removed, no further increase in the urea of the blood occurs. There is a progressive increase in the amino-acid content of the blood following removal of the liver and injection of amino acids in the dehepatized animal is not followed by an increase of urea. These experiments demonstrate that the formation of urea depends on the liver.

The liver is also of importance in another phase of protein metabolism, that relative to the purines. Another important nitrogenous by-product, besides urea, is uric acid. In some species of animals almost all the nitrogen is excreted as uric acid, while in other species little is excreted in this form. The dog belongs to the latter group. Normally there is only a trace of uric acid in his blood and very little is excreted in the urine. However, after the liver has been removed, uric acid appears in the blood and large amounts are excreted in the urine. When uric acid is injected into the normal dog it is quickly destroyed, but when it is injected in the dehepatized dog, it remains unchanged in the blood and tissues or is excreted in the urine. These experiments demonstrate that the dehepatized animal cannot destroy uric acid. What bearing this fact may have in a consideration of the function of the liver of man cannot as yet be determined, since normally much of the uric acid is not destroyed in the human being. On the other hand, the ability of the dog's liver to destroy uric acid appears to be more easily injured than any of the other known functions of the organ.

Among the unsolved problems concerning the activity of the liver is the relation of this organ to fat metabolism. It is not as yet known whether the liver is of any great significance in fat metabolism. It has been suggested that the liver prepares the fat for oxidation, but the evidence concerning this is rather meager. It has also been suggested that the liver changes fats into carbohydrates. However, such a transference of foodstuffs has not been conclusively demonstrated. If it does occur, in view of the predominant position of the organ in carbohydrate metabolism, it would not be unreasonable to believe it a part of such a process also. The most conclusive evidence of a relation of the liver to fat metabolism is found in the reciprocal relation of the fat and glycogen content of the organ. In fasting and other conditions in which the glycogen content of the liver decreases, the fat content increases, a further suggestion that the liver has something to do with the metabolism of fat.

It is frequently stated that the liver is a detoxicating organ, that it protects the remaining portion of the body from toxic substances which enter the blood, by destroying their toxicity and making them harmless. The interpolation of the liver between the general

and the portal circulation whereby the portal blood containing the products of absorption from the gastro-intestinal tract must pass through the liver before reaching the remaining portion of the body, would appear to form an anatomic basis for this theory. There is no question that the liver greatly alters many of the substances reaching it, and it must also be accepted that some of these substances are converted from a potentially toxic to a non-toxic state. However, it is difficult to prove that the liver has an important function as a specific detoxicating organ. Certain poisons, as chloroform and phosphorus, injure the liver more than any other organ of the body. This might be interpreted as a protective action of the liver in which it becomes injured in protecting the rest of the body. Some toxic substances produce a much greater reaction in an animal whose liver has been removed. While the liver in a certain sense is a detoxicating organ for certain soluble toxic substances, its function in this respect is probably usually indirect.

On the other hand, the liver is active in removing foreign particles such as bacteria and colloid material from the blood stream. The special agent in this activity appears to be the stellate cells and not the hepatic cells. It is not surprising, in view of this function of the stellate cells, to find that there is considerable evidence also that the liver is of great significance in the formation of opsonin, in the destruction of foreign bodies, in anaphylaxis, and other similar phenomena.

In any consideration of the physiology of the liver, the extra-hepatic biliary tract should not be ignored. While this portion of the liver is insignificant as compared with the remainder of the organ in reference to physiologic activity, it is of great significance clinically because it is so often and so disastrously affected by disease and because present methods of treatment have been so effective.

The extra-hepatic biliary tract of most species of animals, including man, consists of the hepatic ducts, common bile duct, cystic duct and gall-bladder. Of course, the structure of major importance clinically is the gall-bladder. In reference to this it should be emphasized, that the gall-bladder is of physiologic significance, and that it empties its contents through the cystic duct into the duodenum by means of the contraction of its own intrinsic musculature.

That the gall-bladder is of some functional significance is proved by the fact that its removal is usually followed by a dilatation of the extra-hepatic biliary tract; it is capable of greatly concentrating the bile which enters it, and its presence prevents the development of jaundice for many hours after obstruction of the common bile duct. These facts can only be explained on the basis that the gall-bladder actually functions in the organism.

The method of emptying the gall-bladder has been determined by the observation of the exposed viscus under a local anesthetic following a meal of fat administered to a normal animal. The gall-bladder empties, but will not empty if the animal is under a general anesthetic. When it is exposed properly under a local anesthetic, the mechanism is not disturbed and the gall-bladder can actually be seen to empty by slow tonic contraction. The contents are forced through the cystic duct into the duodenum. In this connection it might be well to emphasize a rather misunderstood point with regard to the biliary apparatus. The sphincter at the end of the common bile duct is an anatomic and physiologic reality. Its function is not to prevent the gall-bladder from emptying but to cause it to fill. While changes in intra-abdominal pressure in relation to respiratory movements may have some influence on the emptying of the gall-bladder, particularly if the organ is distended, the most important factor in emptying is its own musculature. While changes in tone of the musculature of the duodenal wall may be of some value in regulating the flow of bile, the sphincter at the end of the choledochus is the chief factor since it directs the bile into the gall-bladder instead of into the duodenum.

While there can be no question that the gall-bladder is of considerable significance physiologically, numerous experiments on animals and operations on man have shown that compensation for its removal is quickly effected. Its various physiologic activities also appear to be very easily injured. Its power of concentrating its bile appears to be more easily injured than its ability to empty. The ease with which the physiologic activity appears to be affected by disease is an important factor in reference to cholecystectomy.

Two physiologic characteristics of the liver should be taken into consideration clinically: (1) its great power to regenerate after injury or surgical removal, and (2) the small amount

of tissue necessary to maintain its known functions. The liver may be very severely injured by such hepatic poisons as chloroform or phosphorus, but recovery may be rapid and complete. The liver of a normal dog will regenerate to its normal weight within a few weeks after 70 per cent of it has been removed. The known functions will be maintained with 15 to 20 per cent of the organ. These facts are worthy of consideration in testing hepatic function.

The chief known functions of the liver have been presented briefly; undoubtedly it has many other functions although but little is known of these. The liver has some influence on the coagulation of the blood, although the exact nature of it is not fully known. The liver also seems to have something to do with the regulation of the circulatory fluid of the body; in fact, it appears to have many as yet little understood functions which have to do with the general well-being of the organism. It is possible that much of the patient's ability to resist disease successfully or to withstand operation, depends directly or indirectly on the liver, and certain observations suggest that it plays a role in malignancy.

Even this brief review of some of the known functions of the liver seems to show that the physiologic significance of the liver can hardly be over-estimated. There is scarcely a vital physiologic process occurring in the body in which this great organ is not directly or indirectly involved. That the liver has hitherto not been considered of more importance clinically is probably owing to its great power to regenerate and to compensate physiologically after injury, and to lack of knowledge of many of its functions. It is probable that a solution of some of the problems concerning the functions of the liver will also solve some of the important and obscure clinical problems. This field for experimental and clinical research is both large and enticing.

LIVER FUNCTION FROM THE STANDPOINT OF DIAGNOSIS.*

By WALTER B. MARTIN, B. S., M. D., Norfolk, Va.

The study of the functional capacity of an organ is an important phase of the development of our knowledge of the initiation and progress of disease. As practicing physicians, we are constantly confronted with the problems of living pathology, and we are eager to utilize any method that will aid in diagnosis, prognosis or treatment.

The evolvement of reasonably accurate methods of studying renal function has greatly extended our knowledge of kidney disease, and has enabled us to more accurately evaluate the extent of injury existing in the living kidney. The estimation of liver function presents a much more difficult problem on account of the manifold activities of the liver, and its apparently great reserve. Extensive injury can exist in the liver without being reflected in a detectable loss of function.

Numerous methods of determining liver function have been proposed, founded on different known or supposed activities of that organ. Strauss[1] introduced a test based on the glycogenic function of the liver, using levulose as the agent. According to his method, 100 grams of this sugar is introduced into the fasting stomach, and examinations of the urine for sugar are made at intervals during the next few hours. The presence of sugar in the urine under these conditions is supposed to indicate a lowered liver function. Bauer[2] advocated the use of 30 grams of galactose as a substitute for levulose, his method being otherwise essentially the same as that of Strauss. These methods at best are only qualitative, and do not assume to estimate the degree of liver dysfunction. Since the introduction of accurate methods of determining blood sugar, Strauss' original method has been modified, and the blood sugar curve has been studied after the ingestion of measured quantities of various sugars. Bodanski[3] in a series of careful experiments on dogs estimated their tolerance for levulose, glucose and galactose. Levulose caused the least rise in blood sugar, but he found a marked fall in the animal's tolerance for this sugar after toxic injury to the liver. Goodpasture[4] demonstrated the presence of a fibrinolytic ferment in certain cases of cirrhosis of the liver, and suggested a test of liver function based on the detection of the presence of this ferment. Abel and Rowntree[5] while looking for an intravenous cathartic found that phenoltetrachlorphthalein injected intravenously is excreted almost altogether by the liver. Four years later, Rowntree, Hurwitz and Bloomfield,[6] and Whipple, Mason and Peighthal[7] described a method of determining liver function by estimating the amount of dye recovered from a forty-eight hour collection

*Read as part of the symposium on Diseases of the Liver before the fifty-seventh annual meeting of the Medical Society of Virginia, at Norfolk, October 12-15, 1926.

of the stools, following its intravenous injection. In 1914, Chesney, Marshall and Rowntree[8] made a complete study of the methods suggested up to that time, i. e., nitrogen partition of the blood, phenoltetrachlorphthalein excretion in the stool, the levulose and galactose tolerance test, Goodpasture's fibrinolytic ferment test, variations in the urobilin output in the urine, and the lipase and fibrinogen tests of Whipple. Brule[9], by ultra microscopic examinations of fresh blood after a meal high in fat, demonstrated a variation in the number of fine particles (hemoconia) showing rapid Brownian movement. He considered a decrease in the number of these particles indicative of a decreased liver function. Widal, Abrami and Iancovesco[10] described their so-called hemoclastic crisis test and attributed the phenomena noted to changes in the liver, especially its proteopexic function. According to their method, initial observations are made on a fasting patient, of blood pressure, coagulation time, leucocyte count and refractive index of the blood. Following the ingestion of 200 c.c. of milk, similar observations are made at frequent intervals for several hours. A decrease in blood pressure, leucocyte count and refractive index, with an increase in the coagulability of the blood is considered a positive reaction. The majority of investigators have not confirmed the findings of Widal and his co-workers, and the conclusion seems justified that other factors than liver deficiency are concerned in the production of the hemoclastic crisis. None of the methods, so far mentioned, have proven of practical clinical importance, due either to inherent defects in the methods or to their lack of simplicity.

Two groups of tests have been developed in recent years that seem to offer definite evidence as to the functional state of the liver, i. e., those based on the determination of the degree of retention or accumulation in the blood stream of bile pigment, and those in which, after the intravenous injection of certain dyes, estimation is made of the amount of dye excreted by the liver or retained in the blood stream in a given period of time.

Various methods have been advocated for estimating the bilirubin content of the serum. The simplest method is that described by Mullengracht[11] and modified by Maue.[12] This test is relatively easy to perform, and within certain limits gives useful clinical information. Approximately 5 c.c. of blood is withdrawn from a vein into a clean, dry test tube. After separation of the serum, this is carefully pipetted off, and a comparison of color is made in a Duboscq colorimeter, against a standard 1 to 10,000 solution of potassium bi-chromate. The standard is set at 15 m.m. and this number divided by the number on the serum scale, represents the icterus index. If the serum is highly colored, suitable dilutions must be made before reading. The icterus index for normal sera falls between 4 and 6; in most cases ranges around 5. The point at which visible jaundice appears varies considerably in different cases, but generally is around 15.

There exists then a zone of bilirubin retention that can be detected by this test, though no visible jaundice is present. One is enabled to follow the progress of jaundice, either upward or downward. Changes in the degree of jaundice are difficult to detect visually, especially if the case is one of long standing and the skin and mucous membrane have become deeply stained. By this method, daily fluctuations can be accurately charted. The principal sources of error are the presence of a small amount of haemolysis and the occurrence in the blood of coloring matter other than bile pigment. The first difficulty can be obviated by ordinary care in taking and preserving the blood specimen. The second contingency is rather rare, and need not cause confusion. Cloudiness of the serum, which may make the reading difficult can be avoided by taking the blood when patient is in a fasting state. This method is of special value in the differentiation of primary and secondary anaemia. Characteristically, in the first condition there is an increase in the serum bilirubin due to the augmented blood destruction going on, and the inability of the liver to rapidly remove the pigment from the blood stream. On the other hand, secondary anaemia shows a low serum figure. This may be of practical value in cases of carcinoma, presenting a blood picture not unlike that of pernicious anaemia, and associated with an absence of hydrochloric acid in the stomach. Bernheim[13] records 10 cases of pernicious anaemia, all of which show an increase in the icterus index, ranging from 6.5 to 12.5. Murphy[14] reports 40 cases of pernicious anaemia, all but 5 with indices of 7 or more, and some ranging as high as 40. Of 34 cases of secondary anemia studied by the same author, 25 had indices of 3 or under.

A steady, persistent rise of the icterus index may be associated with any obstructing lesion of the biliary system, either extra- or intrahepatic, such as malignancy, stone in the common duct or catarrhal infection. Observations of the icterus index accurately record the change in the serum bilirubin from day to day, and may enable us to differentiate these conditions. The passage of an obstructing stone is soon followed by a definite fall of the level of the serum bilirubin. This may be detected by tests before there is a visible change in the degree of jaundice. A transitory rise in the serum bilirubin has been shown to occur in many cases following acute gall-bladder attack without obstruction. This observation may be of definite aid in arriving at diagnosis in cases of acute upper right quadrant attacks. In chronic liver conditions, the icterus index is of little value, except to follow the course of the disease and to detect the early onset of jaundice.

The van den Bergh[15] test is based on the observation that when freshly prepared Ehrlich's diazo reagent is added to the serum of certain patients, a color reaction develops due to the formation of a dye, azobilirubin, while in others this reaction only occurs when the diazo reagent is added to the serum together with alcohol. The first type of reaction is called the direct and is said to be indicative of obstructive jaundice, while the second type or indirect occurs in the presence of jaundice of haemolytic origin.

In addition to the two types mentioned, we have a delayed reaction and a biphasic reaction. A reaction is considered immediate direct, if on the addition of the diazo reagent to the serum, color develops in less than 30 seconds. If color appears after 30 seconds, it is called a delayed direct. If no color appears, it is called a negative direct reaction. If color appears before 30 seconds and then after that time becomes more intense, it is termed a biphasic reaction. All sera that give a positive direct reaction will also give a positive indirect. Quantitative measurement of the serum bilirubin is made by comparing the color obtained by the indirect method with a standard color solution in a suitable colorimeter. The standard is made up to match a color equivalent to a concentration of 5 mg. of bilirubin per liter. This amount is considered one unit. Thus, a concentration of 3 mg. of bilirubin per liter would be equivalent to .6 units and a concentration of 20 mg. per liter would be equal to 4 units. The amount of bilirubin in normal sera is from 1 to 3 mg. per liter or .2 to .6 units.

The van den Bergh method has several advantages. The concentration of bilirubin is expressed quantitatively in standard units or in mg. per liter. The presence of a small amount of haemolysis or of a pigment in the blood stream other than bilirubin does not affect the accuracy of the test. Technically, the test is more complicated and on this account, there are more possibilities of error in carrying it out. Clinically, it has the same field of usefulness as the icterus index, and besides has been advocated as a means of differentiating between haemolytic and obstructive jaundice. This claim was first put forward by van den Bergh, and has been supported by a number of other investigators. McNee[16] considers the method to be of distinct value in differentiating these two types of jaundice. Radvin,[17] in a study of more than a hundred cases, concludes that the results of the test are in accord with the clinical picture, and that it differentiates consistently between obstructive and non-obstructive jaundice. Green, Snell and Walters[18] consider that the value of the direct and indirect reaction in differential diagnosis is doubtful, but that the quantitative reaction is an accurate and reliable measure of the serum bilirubin. While differences of opinion exist as to the interpretation of the direct and indirect reaction in terms of obstructive and haemolytic jaundice, it is evident that in these two reactions, we are dealing with at least two different chemical compounds causing jaundice. It would seem important to differentiate these two varieties of bilirubinemia, even if we cannot agree as to the cause of the difference.

Due to the cumbersomeness of the procedure first used to determine the function of the liver by means of phenoltetrachlorphthalein excretion and its inherent inaccuracies, this method, when first introduced, did not gain much favor. McNeil[19] in 1916 modified the test by estimating the amount of dye in bile obtained directly from the duodenum by means of an Einhorn tube, after the intravenous injection of a measured amount of dye. Rosenthal[20] in 1922 estimated the amount of dye remaining in the blood stream at certain intervals after its intravenous injection. Three years later, after a comparative study of the numerous phthalein compounds, Rosenthal and White[21] advo-

cated the use of bromsulphalein (phenoltetrabromphthalein sodium sulphonate) in place of phenoltetrachlorphthalein and pointed out certain advantages that it possessed as an agent for the study of liver function. Their method is relatively simple. A sterile 5 per cent solution of the dye is used and a sufficient quantity injected intravenously to allow 2 mg. per kilo of body weight. Specimens of blood are taken at exactly 5 minutes, 30 minutes and 60 minutes after the injection. After coagulation of the blood, the serum is carefully removed and placed in two small test tubes. To one is added 2 drops of 10 per cent solution of sodium hydroxide and to the other a drop of 5 per cent hydrochloric acid. By comparison, according to the method of Bogen[22] with a series of standard color tubes, the amount of dye can be estimated in each specimen. The one hour specimen may be omitted if the dye has disappeared at the end of thirty minutes. Rosenthal[20] records tests with phenoltetrachlorphthalein on 10 normal individuals and 10 patients with extra hepatic disease, and considers a retention of 6 per cent at 55 minutes and 2 per cent at 60 minutes as the upper normal limit. He found abnormally high retention in 5 cases of carcinoma of the liver, and 4 cases of cirrhosis and in scattered cases of acute hepatitis, arsphenamine toxemia, solitary liver abscess, chronic passive congestion and toxemia of pregnancy. Using bromsulphalein, the same investigator[21] found that, in 25 normal cases, the serum was practically free from dye at the end of thirty minutes. The retention at the end of 5 minutes ranged from 20 to 50 per cent. In 25 cases of liver disease, he found retention at 30 minutes of from 3 to 99 per cent, and considers that, as the dye is normally absent after that time, the percentage of retention can be interpreted as a true index of the degree of liver impairment. Murphy,[14] using the phenoltetrachlorphthalein, found retention of from 3 to 30 per cent in all but one of various hepatic cases and normal figures on his non-hepatic cases, but concludes that the test has little diagnostic or prognostic value since the clinical diagnosis had already been made by other methods. Rosenfeld and Schneider[23] found that normal pregnant women showed the same curve of dye excretion as non-pregnant cases, but that in the toxemia of pregnancy, definite evidence of liver damage was shown by the degree of dye retention. The change in liver function as shown by this test preceded the clinical symptoms, and they suggest that, by using this method in suspected cases, we may anticipate the appearance of clinical symptoms and, consequently, begin treatment sooner. Smith[24] considers the retention of the dye in the pre-eclampsia toxemia of pregnancy a valuable aid in differentiating this group from the nephritic cases. Green and Conner[25] report dye retention in Banti's disease, and believe that it indicates the severity of the accompanying cirrhotic changes in the liver. In pernicious anaemia, polycythemia, leukaemia and Gaucher's anaemia they found no change from the normal dye retention.

Time is too limited to review but a small portion of the evidence bearing on the clinical value of the various liver function tests. Even those methods that are most promising must be subjected to further trial and our final judgment as to their merit must await the accumulation of further clinical and experimental data. At present, however, I believe that we are justified in concluding that the icterus index test, the estimation of serum bilirubin by the van den Bergh method and Rosenthal's bromsulphalein test, separately or combined, furnish valuable clinical information in the investigation of liver disease. They are of sufficient simplicity to be carried out in any well-equipped laboratory, and present no particular technical difficulties in their performance. By means of one or more of these methods, we are aided in differentiating the primary and secondary anaemia, in separating haemolytic from non-haemolytic jaundice, and in studying the functional changes of the liver brought about by mechanical injury, infection or toxic factors.

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ROENTGEN RAY STUDIES OF DISEASES OF THE GALL-TRACT.*

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The use of the roentgen ray in the diagnosis of gall-tract disease is limited almost entirely to the gall-bladder. Before Graham, Cole, and Copher in 1924 gave us the gall-bladder dye test, the roentgen ray was of definite value in demonstrating around 20 to 30 per cent of gall-stones and in showing adhesions around the gall-bladder in a small percentage of cases. This left a rather large number of definitely diseased gall-bladders where no definite information could be obtained by this examination.

After the intravenous injection or oral administration of iodeikon, the gall-bladder can be demonstrated on the film almost as clearly as the stomach can after a barium meal.

Graham began this work with the theory that if he could obtain a substance relatively non-toxic and soluble, containing a metal or atoms of iodine or bromine which could be carried to the gall-bladder in sufficient concentration, this material in the gall-bladder would make it opaque to the roentgen ray. Necessarily the substance would have to be excreted by the liver and carried to the gall-bladder in the bile. Using the knowledge that the gall-bladder concentrates its bile, he reasoned that a certain time would have to elapse before a shadow of maximal density would occur. He also concluded that a normal gall-bladder would show the densest shadow, and that if the liver were too badly diseased to excrete the material, or the cystic duct were blocked, or the function of the gall-bladder seriously impaired, no shadow would be produced. During their investigations they used a great many compounds which were the derivatives of the phenolphthalein and phthalein groups, and finally recommended tetrabromphenolphthalein.

In January, 1925, Whitaker and Milliken recommended the use of sodium tetraiodophenolphthalein, since this salt is no more toxic and is about twice as opaque to the roentgen ray as the tetrabrom salt.

The dye can be given orally in enteric coated capsules or intravenously. When it is given intravenously, a faint gall-bladder shadow can usually be seen from about the fourth to the seventh hour afterwards. The shadow of the normal gall-bladder as a rule increases in density until about the twenty-fourth hour, but at this time it is about half the normal size. From this time until the thirty-sixth to forty-eighth hour the shadow gradually decreases in size until it disappears entirely.

In cholecystography we have not only an unusually accurate method for the study of disease of the gall-bladder, but also for the study of gall-bladder function. The size, contour, and position of the gall-bladder shadow are plainly visible. Cholesterol or negative gall-stones show as less dense areas within the gall-bladder shadow. Adhesions distort or pull the gall-bladder to one side. Of more value probably than any of these are the findings in the cases where no gall-bladder shadow, or a very faint shadow, shows. Where no shadow at all shows, especially by the intravenous method, usually there is an obstruction of the cystic duct or marked disease of the walls of the gall-bladder. Graham has shown that usually in cholecystitis, the interstitial tissues and lymphatics of the gall-bladder, and not the mucosa, are diseased, and that this is probably due to the fact that gall-bladder inflammations are so frequently associated with a lymphangitis secondary to an hepatitis. When the lymphatics of the gall-bladder wall

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are diseased the organ loses its power of concentrating the bile and in the same way the power to concentrate the dye, and gives a less dense shadow. A very serious disturbance of the liver function might also cause an insufficient amount of the dye to be excreted to cast a shadow of the gall-bladder, but in all probability in such instances there would be some clinical evidence of liver disease. When using the oral method a marked disturbance of intestinal digestion and absorption might prevent enough of the dye being carried to the liver to cast a shadow of the gall-bladder.

Sosman, using cholecystography, has made a rather extensive study of the function of the gall-bladder. After using many drugs and foods by mouth and duodenal tube, he found that fats by mouth cause the quickest and by far the most marked effect on the gall-bladder. Within from twenty minutes to one hour and a half after the ingestion of fats, the normal gall-bladder will contract markedly and practically empty itself of the dye. He was unable to satisfactorily explain this phenomenon, since the gall-bladder gave the same quick response to the ingestion of fats in a patient who had a gastro-enterostomy and closed pylorus. It is not definitely known whether the gall-bladder empties through the cystic duct or through the lymph and vascular channels in the gall-bladder wall. However, the majority of investigators believe that it empties through the cystic duct. Sosman found that psychic tests, sight, smell, and taste of food had no effect on the gall-bladder. Carbohydrates had no effect; proteins and peptones caused a moderate decrease in the size of the shadow. Olive oil and castor oil, by mouth; atropin, physostigmin, pituitrin, adrenalin, by hypodermic injection; hydrochloric acid, nitroglycerin, meat extracts, ginger, sugar, starch, glucose, and alcohol, by mouth, had no appreciable effect on the size or density of the gall-bladder shadow. Mechanical factors, forced respiration, heat and cold, stimulation of the ampulla of Vater by food, etc., had practically no effect. Magnesium sulphate by duodenal tube had only a moderate effect on the gall-bladder.

Sosman found that an intact sphincter of Oddi was necessary to obtain a normal cholecystogram. Sodium bicarbonate by mouth caused a slight increase in the size of the gall-bladder shadow. He suggests that this apparent relaxation of the gall-bladder may be the reason why many gall-bladder patients experience some relief after the ingestion of alkalies. We know that fats cause a marked contraction of the gall-bladder, and he also suggests this as a possible reason why many patients with cholelithiasis avoid fats.

In diseased gall-bladders, the concentration of the dye and the contraction of the gall-bladder depend upon the amount of disease present. Where there is marked disease, practically no concentration occurs. This frequently enables us to determine slight variations from the normal, and it is hoped that by making earlier diagnoses, diseased gall-bladders can be removed, giving complete relief from symptoms before there has been a widespread involvement of the lymphatics, liver, and pancreas.

Cholecystography has become a routine procedure in all the large clinics throughout the country, and all of them report the method as accurate in percentages varying from 90 to 96 per cent. The average is about 93. This is a remarkable record when compared with previous statistics. In our own work the diagnosis has proven correct in about 90 per cent. Where the diagnosis is doubtful after the oral method, an intravenous injection should be done; since only in this way can we be certain that the dye has reached the liver.

When positive evidence of gall-bladder disease is found by this test of gall-bladder function, we believe that the method will almost invariably prove correct at operation. Occasionally a gall-bladder functioning normally and reported as normal will be found at operation to be slightly diseased. This, in our experience, is more apt to cause error than is the reporting of a normal gall-bladder as diseased. However, if the time of the appearance of the dye as well as the amount of concentration is taken into consideration, probably very few cases will be reported as normal when there is definite disease present.

Summary

We believe that where this test is combined with the usual gastro-intestinal barium meal examination, including a barium enema and, in certain instances, an examination of the bile obtained by duodenal tube, a far greater percentage of correct diagnoses in gastro-intestinal diseases will be made than has been possible in the past.

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THE MEDICAL TREATMENT OF THE DISEASES OF THE LIVER AND GALL-BLADDER.*

By J. C. FLIPPIN, M. D., University, Va.

The speakers preceding me today have been able to recount notable additions during the past several years to our knowledge of the physiology of the liver, as well as to diagnostic measures of very great value and promise in connection with the diseases of the liver and of the gall-bladder. I feel reasonably sure the gentleman who follows me can and will with justice record advances of more or less importance in the surgery of these organs.

To what drug or to what method of medical treatment can one point today and say this constitutes a real addition to our knowledge of the management of the diseased liver or gall-bladder? Perhaps there are those present who will disagree, but in my opinion there has been no contribution rational or empirical of a fundamental nature to our knowledge of the non-surgical treatment of the liver or gall-bladder within my generation. Perhaps I should say that I do not refer to syphilis, malaria or other systemic infections, which may involve the liver along with other organs and tissues, or to obviously secondary involvements of the liver, as in the congestion of heart disease.

When inquiry is made into the probable reasons for lack of advance in the treatment of the liver particularly, it will be seen that clinical experience and empiricism have yielded us little of value. Pharmacology and rational therapeutics have been greatly handicapped by our ignorance of the fundamental facts of physiology upon which developments in these fields of investigation are dependent. Comparatively recent investigations, of which those of our distinguished guest have been by all odds the most important, are beginning to clear our vision and will doubtless prepare the way for a more productive era in the fields of pathological physiology, pharmacology and treatment.

Our medical fathers attributed many ills

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to supposed liver disorders. Some of these are still firmly fixed in the minds of the laity, who insist upon being treated for sluggish, inactive or torpid liver or for so-called biliousness. These are, of course, no longer satisfying concepts in modern medicine. We must think of liver disturbances as being concerned with one or more of the known activities of liver cells, such as the storage and subsequent liberation of carbohydrates and fats; its essential activity in connection with protein derivatives in the body; the bile excretory function; its specific action in destroying toxins; or other of the recognized functions of the organ.

Thus far experimental methods have yielded but meager information in regard to the perversion of any of these important functions of the liver. The problem is being studied by a number of investigators, but I think I may fairly state, without going into the details of recent publications, that thus far not a great deal of headway has been made. It often happens that bedside observation precedes the work of the laboratory investigator. In case of liver dysfunctions, however, it would seem that we have no clear clinical concept or picture of any one of the disturbances of liver activity, except where there exists the advanced stages of anatomical change. Atrophic cirrhosis is an example of what is meant. With its multifold functions, it is, of course, easily conceivable that disturbances may occur either in conjunction with or independent of definite anatomical changes. On the other hand, there is much evidence to support the supposition that the liver has a very large margin of compensatory safety. In any event, the point I wish to make is that at present we have a very vague and unsatisfactory clinical picture of liver disease, other than the syndromes coming on in the advanced stages of pathological processes.

On the other hand, if modern pharmacology has been barren in the sense of not affording us remedies known to have specific action on liver function, it has at least taught us that many of the drugs formerly and frequently employed for their supposed action on the liver are without demonstrable effect. The list of so-called cholagogues was formerly large and probably no group of drugs was more frequently employed. Today the list is very small and the survivors are viewed with more or less distrust. Probably certain food substances, the proteins and fats, have more influence than any other agents on the rate of bile excretion from the liver. Bile salts act as stimulants to excretion in a more or less selective way as regards the constituents of the bile, but the action of these salts cannot be said to be sufficiently strong to be of great clinical importance. Magnesium sulphate coming in contact with the duodenal mucosa seems to definitely increase the flow of bile. The same is true of certain oils and fats. McClure and others have used oleic acid extensively in experiments upon animals. Olive oil has long been employed in the treatment of gall-bladder disease, and its action is probably explainable upon this ground. The action of benzoates and salicylates as cholagogues is apparently too weak for therapeutic purposes. No drug is definitely known to increase the amount of cholesterin excreted by the liver. Insulin is, of course, concerned with carbohydrate metabolism, but does not directly affect liver function so far as is known. Others have called attention to the remarkable fact that fortunes have been made in so-called liver pills and yet medical science is practically without knowledge of a drug which has a direct or important influence upon any one of the known functions of the liver cell.

At this point I should mention the recently employed use of novasurol in cirrhosis of the liver. It will be remembered that novasurol was introduced some years ago by German investigators. It is an organic mercurial containing something more than 33 per cent of mercury. Its largest field of usefulness has apparently been as a diuretic in heart disease, but it is also used in nephritis and in cirrhosis of the liver. Rowntree and his co-workers have reported good results from the use of this drug in the ascites accompanying liver cirrhosis. It is usually given intramuscularly in dosage of ½ to 2 c.c. of a 10 per cent solution. Such a dose is given at intervals of several days. Keith and his associates have combined the use of ammonium chloride with novasurol, giving the ammonium chloride for several days preceding the administration of the latter. It is said that novasurol produces a diuresis greater than that gotten from any other known diuretic. Our experience in the University Hospital bears this out, but our observations have been, as yet, too limited to warrant definite conclusions.

Gall-bladder disease presents itself to us

clinically as a far more definite and a more easily recognized entity than do diseases of the liver itself. Without attempting to quote statistics, it seems fairly well established that gall-bladder disease is very frequently encountered in its acute and chronic form, as well as being responsible for an exceedingly large group of chronic digestive disorders and probably of other more remote disturbances in the body. I think we will all agree that no agent at our command has any appreciable effect in the expulsion of the formed stone from the gall-bladder or bile duct. To quote Bland-Sutton, "Although the medicine man can point to wonderful cures and the sorcerers can cast out imaginary devils, neither a sorcerer nor a physician can expel gall-stones." Many small stones and some larger ones pass into the intestines through the bile duct from time to time, but we cannot in any measurable degree effect the expulsion. We are also without any satisfactory means of destroying the stones in the gall-bladder or ducts by solution or otherwise. It also seems that there is little prospect that an agent will be found to either dissolve or expel stones. Medical treatment is, therefore, seemingly concerned with discovering a method of preventing the formation of gall-stones. There are two well-known theories of gall-stone production, which more or less merge into one. It is generally believed that infection occurs first, and later there is a deposition of cholesterin, bile pigment, calcium and other substances forming the stone. If this is true, the problem of preventing gall-stones is the same as that of the prevention of cholecystitis. There are those, however, among them Moynihan, who believe that pure cholesterin stones are formed independently of infection. In this event, cholesterin metabolism and excretion may play an important role in the etiology of such stones.

Naunyn and his pupils taught that the cholesterin output of the liver was constant and uninfluenced by diet, and this has been more or less an accepted idea for years.

It is interesting to note that recent investigations, notably those of Rous and McMasters, have shown that blood cholesterin and particularly the concentration of cholesterin in bile varies considerably with the food intake. During starvation the cholesterin content of the bile is very low. If food rich in cholesterin, such as egg yolk, brains and liver are taken, the cholesterin content of the bile is very considerably increased. According to Moynihan, it is also increased in the blood during the period of pregnancy and possibly during the menstrual period. These observations are, of course, in line with clinical statistics, which show that gall-bladder disease is most common in women who have had repeated pregnancies. Moynihan and other workers also find a relatively high blood cholesterin in individuals known to have cholelithiasis. These observations offer some rational basis for prophylaxis, as a diet low in cholesterin would be indicated where gall-bladder disease can be detected in its earlier stage. The prevention of infection is at present an unsolved problem. Apparently, infection may be carried to the gall-bladder through the general circulation, from the portal system, or by way of the lymphatics. The bile is apparently a natural channel for the excretion of dead or living bacteria, and, like the tonsils, the bile excretory apparatus often sacrifices itself in performing this function. The problem here is that of eradicating focal infection elsewhere in the body and particularly of avoiding long standing inflammatory conditions in the area of the drainage of the portal vein. The fact that certain drugs of the phthalein group are shown to be concentrated in the gall-bladder under normal conditions at least suggests the possibility that a drug may be found of antiseptic properties capable of concentration in the bile to a sufficient degree to act as a bactericidal agent. In the past hexamethylenamine (urotropin) has been used for this purpose. It still has its advocates, but it is generally believed that its effects are practically negligible.

The problem of the treatment of cholecystitis by so-called non-surgical drainage is one about which there is far more room for discussion. To restate the technique of transduodenal drainage as advocated by Lyon or of Meltzer's law of contrary innervation, upon which it is based, is, I take it, unnecessary in this body. From the outset, Lyon's suggestion caught the attention of the medical world. To greater or less extent the method has probably been used in every clinic and by many practitioners throughout this and other countries. A large number of reports are available in the current literature of the past several years dealing with various aspects of the subject. It will be understood that these remarks have reference solely to the therapeutic application of the method. Perhaps the report

setting forth the most striking statistical data, as well as the fullest exposition of the principles involved, is that of Lyon and Swalm presented at the May, 1925, meeting of the American Medical Association. It may be recalled that this report was based upon some 14,000 drainages. A study was made of 376 cases of gall-bladder disease of which 318 were treated by duodenal drainage combined with other non-surgical methods. Briefly put, these authors state that permanent cure was effected in 30 per cent of cases; 52 per cent were much improved, could discontinue further treatment, and remained in good health for more than a year; 9 per cent were considerably improved, and only 2 per cent were entirely unimproved, of which one died. In this article the authors enumerate some fifteen classes of cases in which they consider the method indicated. Time does not permit me to go over these, but they believe that excellent results may be obtained in three out of four of all gall-tract patients by the use of non-surgical methods. Reports from many other observers show beneficial results in varying degree. These include some of our most prominent internists and gastro-enterologists—men of extensive clinical experience.

On the other hand, the method has been tried and practically discarded by many other equally able observers. From available information there is little doubt that there is a group of cases in which the patient will either recover entirely or be materially or temporarily benefited by the regime advocated by Lyon. The question is, whether this group would not do qually well if treated by other non-surgical methods. In other words, does intermittent or continuous duodenal intubation and medication fulfill therapeutic demands not attainable by other procedures. Personally, I share the difficulties and doubts expressed by Prof. Carlson concerning Lyon's theories. It will be recalled that Soper and others report having obtained results experimentally and clinically by the use of magnesium sulphate administered by mouth as definite as by the use of the duodenal tube. In the University Hospital we have thought our cases of acute catarrhal jaundice recovered more rapidly when treated by the tube than otherwise. We have treated cases of cholecystitis by Lyon's method with varying degrees of success. Incidentally (but not fundamentally) the mental impression on certain patients of seeing the bile drained from their intestines is most impressive. As a personal opinion, I greatly doubt whether in its present form the Lyon method has more than a limited field of usefulness as a system of treatment.

As regards other medical measures, I see no reason for believing otherwise than that many cases of cholecystitis are cured and others relieved for considerable periods of time by the careful and judicious use of dietary, medicinal and other measures at our command. These cases require careful investigations, particularly those in which the manifestations are largely digestive. Much can be done for these patients by diet and medication directed to hyper- or hypo-chlorhydria, pylorospasm, constipation or other reflex or accompanying conditions which may be present in the individual case. I am wedded to no particular drugs or methods and will not take the time to outline methods of treatments which are readily accessible in current literature and standard texts.

Finally, those of us who follow our cases to the operating table are impressed with the futility of present day non-surgical methods in dealing with many chronic, deep-seated infections of the gall-bladder or ducts, oftentimes filled with stones. Aside from local and digestive distress, the chronically infected gall-bladder acting as a focal infection, is probably as dangerous as the infected tonsil, sinus or tooth. It is, therefore, to be greatly hoped that improvements in methods of diagnosis will enable us to more clearly differentiate the group of cases in which we can expect cures by medical methods from that group in which it is the clear duty of the physician to put his patient into the hands of a competent surgeon.

SURGICAL TREATMENT OF THE LIVER AND GALL-TRACT DISEASES.*

By HUGH H. TROUT, M. D., Roanoke, Va.

There must be some reason for the number of medical societies having selected liver and gall-tract diseases as the subject for discussion, as well as the literature abounding with articles dealing with various problems concerning hepatic function and disturbances. Certainly the somewhat recent work of Evarts Graham and his co-workers, along with the studies of Judd, Rowntree, van der Bergh, Sweet, Mann and numerous others is sufficient stimulus to explain this increased interest in

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the subject selected by the Medical Society of Virginia for their symposium at this meeting.

Cysts and secondary abscesses of the liver are the most frequent surgical conditions involving this organ, and, as their surgical treatment is so evident, it has been decided to confine this part of the symposium largely to the surgical treatment of the diseases of the biliary tract. However, the Talma-Morrison operation for cirrhosis of liver does occasionally give good results, but, where there is a large amount of ascitic fluid with liver destruction, no beneficial results should be expected.

In gall-bladder surgery, as in every other branch of surgery, when to operate is usually a hard question to decide, but, also, when not to operate is often even more perplexing. We have all seen cases which were apparently definitely cholecystitis, but in whom a positive Wassermann was obtained and, with proper treatment, the symptoms disappeared. In the practice of doing routine Wassermanns and Kahns, we have, during the past several years, picked up almost accidentally four cases in whom syphilis was causing the symptoms of gall-tract trouble, but in whom there was no history of luetic infection and two of the cases had had their gall-bladders removed—one of which we did—and, in both, the symptoms persisted after the operation until relieved by antiluetic treatment. The other two were saved from operation by the routine taking of Wassermanns and Kahns.

Not so many years ago in gall-bladder cases, the dictum was "the time to operate is when the surgeon first sees the patient." Happily for the patient, that day, which was never popular, has passed, and now we find ourselves somewhat in the same position we were a few years ago in regard to the prostatic patient, in that we are today beginning to make a more careful study of the patient's history, a more thorough and comprehensive examination of blood and urine, and, to a certain extent, are able to apply a fairly satisfactory functional hepatic test. This analogy between the liver and urinary tract is very attractively presented in the *Annals of Surgery*, October, 1926, by Edwin Beer. With these various aids as our guides, we are today preparing our patients for safer operations done at the proper time, and carried through their convalescence with less discomfort and decreasing mortality and morbidity.

Whenever it is possible for a patient with an acute gall-bladder to "cool off" before an operation, it should be done. However, the patient should be in a hospital where a careful watch can be made of the progress, and any emergency met that might arise.

In the pre-operative preparation of the patient, not only should the coagulation time be estimated but some definite determination be made of the amount of bile pigment (bilirubin) present, so as to use these, along with the clinical study of the individual patient, as guides in the bringing of the patient to the best possible condition for operation.

If the coagulation time is over five (5) minutes, and no surgical emergency exists, calcium lactate by mouth can be depended on to improve this complication. This is given by mouth in a soluble form in 20 grain doses three times a day. In addition to this, the employment of an abundant fluid and carbohydrate intake will materially help. However, if the coagulation time is greatly delayed, especially if the patient's condition demands an immediate operation, 5 c.c. of a 10 per cent solution of calcium chloride given intravenously as recommended by Walters and Waltman[1] will add much to the safety of the operation and convalescence.

Blood transfusions are sometimes of aid, but should only be undertaken with extreme care, for a blood graft is not without its own danger, and no matter what method is employed "reactions" do occur.

Glucose intravenously, when indicated, should also be given with caution, as should all medication given in the vein.

Of the various tests to estimate the amount of bile pigment (bilirubin) in the blood, the van den Bergh or some modification, such as Murphy's,[2] is the one most commonly employed. Very little, except operative interference, can be done to reduce the amount of bilirubin in the blood where such retention is due to obstruction of the bile duct. Some small reduction might be expected by increased renal elimination, though, naturally, this is very indefinite.

Abel and Rowntree, in their application of the phenoltetrachlorphthalein dye test to the liver, have furnished us with the basis of a functional test which eventually will probably be as much aid to the surgeon in preparing the patient for a gall-tract operation, as the phenolsulphonephthalein is now in the prep-

aration of a prostatic and kidney patient. However, as an aid in proper preparation of a patient with a biliary tract complication, the test, as yet, has not proven of much practical aid, but it is of distinct value in helping us to determine whether to do a cholecystectomy or cholecystotomy.

One should not be too enthusiastic about placing any dye in the blood stream, for, here, also, "reactions" do occur in spite of what some advocates of the tests claim. The role of the reticulo-endothelial system in such reactions is a most interesting speculative field, but the practical application is, intravenous dye tests are not without danger and discomfort to the patient.

If we are not careful, in our desire to use the advantages of these new methods, we may easily forget that pre-operative preparation can be far over-balanced by the risks in delay, especially in jaundiced patients. Also, the information so obtained may not be worth sufficient to the patient to justify the inconvenience necessitated.

The practice of some surgeons of reducing rapidly the weight of patients before operations is bad, for, in such a process, they also lessen the resistance of the patient. In very obese patients, if the surgeon can obtain cooperation, reduction can be made slowly and without danger by a suitable diet, if the symptoms will allow of delay.

Occasionally one sees a patient who has sugar in the urine before a cholecystectomy for gall-stones or cholecystitis, which disappears after the operation, and, incidentally, these cases are usually quite fat. I do not think these cases should be considered to be true diabetics, but rather patients with some infection of the pancreas which is relieved by removing the infected gall-bladder.

Having properly prepared the patient for the operation, naturally, the first question to arise will be the choice of the anaesthetic. While ethylene and oxygen unquestionably have a very definite role in the handicapped patient, ether will continue, for some time to come, the safest and most satisfactory in the hands of the average surgeon. However, it should not be forgotten that ethylene and oxygen do give a better relaxation than is usual with nitrous oxide and oxygen, and often, especially when combined with a little ether, will allow the surgeon a satisfactory and comfortable exposure, and the absence of post-operative nausea will be of considerable aid in the convalescence. The fact that ethylene is explosive should only serve to make us more careful in its use, and certainly not to scare us into not employing it.

A high right rectus incision with the upper part of the incision turned toward the xiphoid cartilage and the skin and fascia cut further down than the peritoneum in the lower end of the incision, usually gives an excellent exposure and allows an easier closure of the peritoneum.

In the uncomplicated cases the liver can be delivered either by traction on the gall-bladder, or, as is done in many hospitals, cutting the suspensory ligament, applying traction on same, and suturing together before closing the abdomen. We have never found it necessary or advisable to pack gauze between the diaphragm and the liver, as has been advocated, for such a procedure would certainly add to the traumatism and shock of the operation, and I do not believe would be of much advantage.

The sooner we learn that gall-stones are a sign of previous trouble and that it is not necessary to have gall-stones to have serious disease of the gall-bladder, then the more definite will be our understanding of the indications for surgical procedures. In this field of surgery, as in all others, surgical judgment is required—so much so that it it now no longer a question of cholecystectomy *versus* cholecystotomy, but rather whether there is, or has been, actual disease existing. For example, the decision as to whether there is a "strawberry" gall-bladder present is sometimes more difficult than some surgeons would have us believe.

It is true a gall-bladder can be removed, and apparently no bad effects follow, but, we should not forget that the gall-bladder has at least two definite functions, and after the removal of the gall-bladder, compensation with the loss of these functions does have to take place. Such compensation means an additional load on some other organ. However, a definitely diseased gall-bladder should unquestionably be removed, and the above remarks are made only to caution against the apparent tendency towards cholecystectomies without sufficient basis to justify the practice.

In deciding whether a gall-bladder is diseased or not, cholecystograph is sometimes of aid. Graham[3] states that the failure of the

gall-bladder to concentrate the material sufficiently does sometimes account for the failure to obtain a shadow of the gall-bladder, and this may be due to disease of the wall, and such a finding will help in the determination as to whether the gall-bladder is diseased or not. He further states, "It is possible, therefore, that a functional test of the gall-bladder, such as is made possible by cholecystography, will readily prove to be a more accurate index of the actual condition of the organ than gross pathological anatomical findings at operation." He, however, does not think this has been tried sufficiently to warrant sweeping conclusions.

Of course, where one finds a small contracted fibrous gall-bladder, one naturally recalls Courvoisier's observation that the gall-bladder has attained this condition by the forcing a stone into the common duct, and somewhat also due to the secondary infection. Therefore, we should expect to find a stone in the common duct in such a case.

With a distended gall-bladder, no adhesions and jaundice, malignancy should be considered.

The size and feel of the lymph nodes is sometimes an aid in determining whether infection is or has been present, as well as the possibility of malignancy.

Many surgeons feel if there is a definite hepatitis present, the gall-bladder, as a source of infection, should be removed, but I, personally, have found it extremely difficult and uncertain to determine whether there is a hepatitis existing or not. Certainly all surgeons should take every opportunity to examine the gross appearance of all livers so that the abnormal liver may be recognized when presented.

Cholecystectomy gives far more satisfactory results in the vast majority of cases, but there are still those cases in which cholecystotomy has a definite field, such as the badly handicapped patient in whom it is best to remove the stone, institute drainage and do this with a local anaesthetic. In a patient with jaundice associated with cholecystitis, cholecystotomy is a safe method of relieving acute symptoms and providing drainage, or in a patient on whom a gastro-enterostomy or some other primary operation has been done and gall-stones present in gall-bladder, cholecystotomy offers a safer procedure than cholecystectomy.

Whenever practical, the appendix should be examined, for there is some relationship between appendicitis and cholecystitis, and, if the patient's condition will justify it, and appendectomy should be done.

Adhesions between the gall-bladder and the duodenum are more often due to cholecystitis than to duodenal ulcer, though Bruce[4] has recently called attention to the association of cholecystitis with duodenal ulcer, and reports six cases in addition to the four previously reported by Judd[5] of bleeding ulcers found in the duodenum which were relieved by cholecystectomy.

The exploration of the common duct is never without some uncertainty, and the opening of the same is not without danger. In this decision, the history, especially as regards jaundice, the condition of the liver, the type of the gall-bladder, the dilatation of the common duct, the amount of bilirubin present, etc., will all be of aid in the determination of this question. Many surgeons have overlooked stones in the common duct, and, I regret to have to state, I know I have in at least one case.

If the common duct is opened, frequently the small finger can be passed upward to the hepatic ducts where stones are very occasionally found, or downward toward the duodenum. A small scoop will often go where the finger will not, but, with the large majority of cases, the surgeon has to be satisfied with the passage of a probe. The passing of a probe through the remains of the cystic duct into the common duct is usually not easy, and often very uncertain. In addition, the common duct has a narrower diameter at its junction with the cystic duct than anywhere else in its length and much traumatism at that locality is, therefore, more apt to result in stricture. Reid, however, advocates draining the common duct, after the removal of stones, through a small tube placed in the cystic duct.

In rare instances, it is necessary to remove stones by opening the duodenum, but this procedure should be avoided if possible. However, this method is far easier than is generally considered, and infection high in the alimentary tract is not as frequent as nearer the colon.

Having decided to remove the gall-bladder brings up the question whether to start the cholecystectomy at the cystic duct and dissect out toward the fundus, or start at the fundus and go toward the cystic duct. There are many advocates of each method, and both present advantages. Personally, I prefer to start at

the cystic duct, but there are cases in which starting at the fundus renders the operation easier and safer. Certainly every surgeon should follow the method which comes most natural to him, and no surgeon should confine himself to either method but employ the one applicable to the individual case.

In regard to drainage after the removal of the gall-bladder in uncomplicated cases, there is much diversity of opinion. I can see no harm in a small drain properly situated with the omentum placed between the duodenum and the drain, and such is a comfort to the surgeon and adds to the safety of the patient, and our practice has always been to drain. I am fortified in this position by having seen, during the last several years, three patients—all supposedly clean cases and none drained—in two of whom we opened abscesses under the liver—one two months after the primary cholecystectomy and the other six months, while the third showed a peritonitis on autopsy. Of course, no one can positively state such complications might not have happened had drainage been employed, but, I have never seen it, and, it does sound more reasonable to presume infection will follow outward a drainage tract.

Holman[7] and Blalock[8] state there was drainage of bile in 35 per cent and 38 per cent of cases following cholecystectomies in the two series of cases they studied. As the bile drainage ceases very soon after removal of the drain—often within twenty-four hours,—it is not probable this bile comes from the cystic duct tie not holding, but, rather the bile is coming from injury to the liver bed from which the gall-bladder has been removed.

Holman concludes this leakage of bile is often due to injury to anomalous branches of the hepatic duct. It is certainly more reasonable to believe this injury is done during the operation than to accept the remote possibility of trauma from the drain being the etiological factor.

A silk tie on cystic duct in clean cases is employed in many clinics. Suturing over the stump of the cystic duct with peritoneum is an excellent practice when easily done, but, where the surrounding tissue is oedematous, etc., the advantages of the procedure are outweighed by the increased danger.

If the drain is removed gradually by the third or fourth day, any nausea which might be due to its presence is prevented.

Yates advocates sewing the peritoneum, which has been dissected off of the gall-bladder, over the drain after it has been placed in the liver bed from which the gall-bladder has been removed.

It is good practice, when practical, to bring the drain through a stab incision in the flank after placing the end of the same in Montgomery's fossa.

Where one has a gangrenous gall-bladder in a patient who is not doing well on the operating table, the suggestion, usually attributed to the late Dr. A. J. Ochsner, of splitting the lower surface of the gall-bladder open, packing with gauze and placing a piece of rubber protective between the gauze and the general peritoneal cavity, has proven of much aid in some difficult cases.

In chronically infected gall-bladders with a probable associated cholangitis, a long tie or clamps can be left on the cystic duct so that the cystic duct can be opened in case of liver sepsis.

Injury to the common duct can best be avoided by having a good exposure and a clear understanding of the anatomy of that region. Occasionally a suture slips, or a clamp springs loose, when tying the cystic vessels, and the surgeon, grabbing with a clamp in a bloody field, includes a portion of the common duct. It is in such a situation as this the suggestion of Dr. W. J. Mayo is of much aid. He advocates catching the region that is bleeding with the fingers; then, while holding with fingers, clean the field, isolate vessels, clamp and tie.

Judd[6] states "the belief is becoming more prevalent through accumulated experience that, in a considerable proportion of cases, common duct stricture is the result of a general obliterative cholangitis."

Where exposure is difficult, the small electric lamp, which is cool and can be sterilized along with the cord, is of distinct aid when placed in the lower angle of the exposed field.

The best method of treating injuries to the common duct is to prevent them by careful and clear isolation of the cystic duct before clamping the same.

However, repair of injury to, or strictures of, the common duct is a "chapter unto itself", and any surgeon who has had one or more such operations to do will realize it is too long a chapter to be discussed except as a separate

paper.

The making of an anastomosis between the gall-bladder and the alimentary tract is gaining in favor, and is indicated in the following type of cases: (a)—In old patients whose pancreas is hard, and the surgeon cannot be sure whether the same is malignant or not; (b)—in inoperable obstructions to the common duct; (c)—diverticulum of the common duct; (d)—in operable lesions of common duct; (e)—carcinoma of gall-bladder. One very interesting point about this procedure is to be found in the fact, when due to the cessation of the pancreatitis, or other cause, there is no longer use for the side-tracking of the bile; the anastomotic opening closes, being similar, in this respect, to what happens frequently in the case of a duodenal ulcer following a gastro-enterostomy.

The position of the alimentary tract which is most convenient and will allow apposition without traction, is the site for the anastomosis.

Crile has been applying heat during and after the operation by means of diathermy to the liver in the badly handicapped patients, but, as yet, this practice has not come into general use.

The post-operative care of such patients is very similar to that of any other abdominal operations, e. g., proctoclysis, subcutaneous infusions, blood transfusions when definitely indicated, gastric lavage more frequently than is generally practiced, and small doses of morphia given frequently.

Here, too, the post-hospital care of the patient should be followed with the aid of the family physician, and I am sure an honest review of our results, studied several years after the patient has left the hospital, will be, on the whole, gratifying, but, in such a study, we will find we have made mistakes, which should be of aid to us in the future.

No attempt has been made to cover this large subject more than very hurriedly, and only the more important and somewhat recent developments have been discussed.

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DISCUSSION OF PAPERS BY DRS. MANN, MARTIN, HODGES, FLIPPIN AND TROUT.

DR. CHARLES C. HASKELL, *Richmond:*—I think we all owe Dr. Mann an immense debt of gratitude. Dr. Mann is representative of the new era. It has not been so many years ago when laboratory worker and clinician were definitely separated; when a worker was put in a laboratory, he was supposed to have nothing at all to do with the clinical side of medicine. He was to work on abstract problems entirely. But the tendency nowadays, certainly in this country, is more and more to have the laboratory worker devote his attention to subjects of practical clinical importance. It was only recently that a prominent English physiologist decried this tendency. He said we should teach in our medical schools abstract physiology, but I think that is erroneous. We want to know the bearing of our work on medical problems. Through a method which is beautiful in its simplicity, Dr. Mann has approached the problem of hepatic function and has already given us a tremendous amount of valuable information. Not only that, but he has stimulated workers elsewhere.

Important as is Dr. Mann's work on the liver, I can not help but feel more attracted to the work that has been done on the gall-bladder. For years it has been believed by physiologists that the gall-bladder has a function. It would seem to be adapted to the work of storing the bile in the interim and supplying it to the intestine when needed. Some of us in Richmond have had evidence that sought to disprove this theory entirely; Dr. Sweet proved to his own satisfaction that the bile never escaped from the gall-bladder. Through the work of Boyden, Whitaker, Mann, and others, it has now been conclusively shown that the gall-bladder does discharge its contents, apparently by muscular contraction. Dr. Mann's statement as to the function of the gall-bladder affords me considerable satisfaction. I do not know anything about practical clinical medicine—therefore I am probably well qualified to discuss it. It never appeared to me that the gall-bladder is a functionless organ. Reading more or less clinical literature, it looked as if a good many surgeons were following a good old Hibernian dictum, "If you see a head, crack it"—if they see something easy to get out, take it out. Now, many people are apparently living all right without gall-bladders, but we can not say definitely that there is nothing wrong with them; the patient may have lived a while longer or may have been a little happier had his gall-bladder not been removed.

In Dr. Flippin's paper the action of magnesium sulphate on the sphincter was brought up. You all know that Meltzer conceived the idea of reciprocal innervation of the sphincter and gall-bladder, that if the sphincter contracted, the gall-bladder relaxed. Lyon, therefore, used magnesium sulphate to inhibit the sphincter. Whitaker suggests that the magnesium sulphate, by its quieting action on plain muscle, relaxes the sphincter, but has no power to cause contraction of the gall-bladder.

DR. J. SHELTON HORSLEY, *Richmond:*—We are all greatly indebted to these gentlemen who have given us this excellent symposium on the liver, and particularly to our distinguished guest, Dr. Mann. Modesty forbade him to stress too much the experimental work which he has done on the gall-bladder. Whitaker, of Harvard, has shown on animals by successive roentgenograms that iodized oil injected directly into the gall-bladder will trickle through the cystic

duct. Whitaker has also shown that when the sphincter of Oddi is paralyzed, so permitting free drainage of bile from the common duct, a very large percentage of these animals develop stone in the gall-bladder. Now, if those animals with free drainage of bile from the common duct tend to develop stone more rapidly, why is the so-called medical drainage of the gall-bladder advocated? We are confusing the so-called medical drainage with surgical drainage. Undoubtedly drainage may be needed, but the tissues should also be given rest. If we have inflammation of the urinary bladder, we introduce a catheter or make a suprapubic incision and drain, but that is quite different from putting a stimulant in the duodenum and making the gall-bladder empty itself. Are we doing good or harm, if the gall-bladder is infected, by giving some substance which causes it to contract more violently than normally? If a tube is in the gall-bladder, as in cholecystostomy, and so inhibits the function of contraction, that is a different matter. Undoubtedly regulation of the diet does good, but I think if we assume that only so-called medical drainage is needed we shall not benefit the patient, except psychologically.

DR. WRIGHT CLARKSON, *Petersburg:*—I am very much interested in Doctor Hodges' paper, because this paper, with the slides shown, has been one of the best and clearest demonstrations I have seen on this subject recently.

I am particularly interested in the absorption of iodeikon (tetraiodophenolpthalein) from the intestinal tract. I do not believe intravenous administration necessary if we can positively determine that the dye was taken by the patient, that it was not vomited, and that it does not remain in the intestinal tract unabsorbed. The presence of unabsorbed dye in the intestines can be determined by a large film to include the entire abdomen.

Just yesterday I had a patient from out of town on whom I wished to do a nine-hour barium test for ileal stasis. I gave her three ounces of barium to take home, with instructions to take all of it in buttermilk at 6 A. M., and return to my office at the usual hour. When she returned I found no barium in the intestines, although she stated she had not vomited in the meantime, also that she was absolutely positive she had taken all of the powder given her. Naturally, I knew she was wrong and had not taken the powder at all. It developed that her mother had given her the buttermilk without the powder. So it is very important in cases showing no dye in the gall-bladder to check carefully the taking of the dye, any vomiting that may have followed, and to examine the abdomen for unabsorbed dye.

It has been demonstrated by workers in this field that the gall-bladder can empty very quickly, and, recalling the slide Doctor Hodges showed us with two shadows of what appeared to be two gall bladders in the same patient, I wish to state that this has happened in my laboratories on two occasions. In each case a film taken a few minutes later showed only one shadow and I believe the second shadow may have been due to dye in a loop of the duodenum, it having been suddenly deposited there by a contraction of the gall-bladder.

It seems to me there is one very important thing we have to do in regard to gall-bladder work and this is to get a very rapidly moving Bucky diaphragm. I am now trying to develop one with which we can obtain films with extremely short exposures, and thus I hope it may be possible to show not only the gall-bladder, but also the cystic and common bile ducts.

DR. MANN, *closing the discussion:*—In the past few years I have had the privilege of being on several symposiums on the liver, and I can say without question that this is the most scientific—using the word in the sense in which the experimental investigator uses it—that I have attended.

I sometimes wonder if we do not take too narrow a view in regard to gall-bladder disease. In many instances it would appear that the condition diagnosed as gall-bladder disease is a more generalized pathologic process in which the involvement of the gall-bladder is only a part. If this is true, it would explain why some patients are cured of their symptoms when the gall-bladder is removed and other seemingly similar cases are not so relieved.

In regard to the X-ray diagnosis of gall-bladder disease, it should be noted that the clinician, surgeon and pathologist, all have their own criteria for the diagnosis of the condition. These criteria do not correspond, and thus a given case will be diagnosed differently by the clinician, surgeon and pathologist. With this in mind, it can readily be seen that until a common standard concerning disease of the gall-bladder is determined upon, it would seem premature to speak of a percentage basis of successful X-ray diagnoses of gall-bladder disease.

FURTHER REMARKS ON PROTATECTOMY. OBSERVATION, PREPARATION, TECHNIQUE AND COMPLICATIONS.*

By ROBERT C. BRYAN, M. D., F. A. C. S., Richmond, Va.

In looking over my records of prostatectomy for the past twenty years, I find that we have had an encouraging mortality in the last hundred cases, it being a considerable improvement over the first hundred, at which time the bugbear of hemorrhage and sepsis was even greater than at the present time.

I recall very well the two-way tube which was used some fifteen years ago, by means of which the bladder was constantly irrigated, the returning reddish fluid getting lighter and lighter in color, directly in keeping with the patient's progressive weakness and exsanguination, so that a fatal termination was not infrequently experienced. It was about this time that the Hagner and Pilcher bags were devised, and I feel assured that many lives have been saved by this device which otherwise would have leaked out their existence by a constant loss of blood. It has been my custom to use these bags invariably, not only for the immediate hemostatic effect they have upon the lacerated blood vessels in the periprostatic plexus, but also for the very satisfactory canalization of the prostatic urethra, which structure, as is well known, is removed at the time of the prostatectomy.

It would appear from our figures that acute retention provokes the patient to surgical in-

*Read before the fifty-seventh annual meeting of the Medical Society of Virginia, at Norfolk, October 12-15, 1926.

terference. As I had the opportunity to state in an article several years ago, these old men pay but little more attention to the phenomenon of nocturnal demands than they do to wearing spectacles, slight deafness, or being unable to run for a street car, considering it one of the phenomena of advancing years, so that it is only with the pain of retention that they seek medical advice.

We have made it our rule to do the suprapubic cystostomy under novocaine immediately on the patient's admission to the hospital and only in a few instances have we attempted the rather complicated gradual decompression of the bladder. In every instance a large right angle tube is sewed in the bladder and, being somewhat elevated by the dressings, the flow from the bladder in a measure is retarded, so that its complete evacuation is not immediate. The rather profound uremic state into which many of these patients go following the suprapubic drainage is due to the transient renal glaucoma from the sudden relief of the overdistended bladder, and requires a careful adjustment of the water intake to the actual heart-power and blood pressure to avoid pulmonary stasis and acute cardiac dilatation, anuria being the leading and most serious complication of the immediate suprapubic cystostomy.

Up to this time no urethral examination has been made, only the rectal investigation, for the acute retention demanded instant surgical relief. Rest, support and water, as some surgeon has said, "water internally, water externally and water eternally", and a daily enema is now the outlined treatment.

Hypodermoclysis. — It is surprising the amount of fluid that can be taken up by the breast and axilla tissues. We have been accustomed to order as a standard rule three days before operation 1,500 to 1,800 c.c. a day, and 1,000 c.c. the day of the operation, which seems to have a beneficial effect upon the blood vessels, kidneys, and in a measure does away with that gnawing thirst that so frequently follows the profound sweating of operation. Following the operation, we are in a large measure guided by the condition of the patient and only in extreme cases do we use hypodermoclysis immediately but usually delay it until the second day. With the least amount of care of the skin on the chest wall it is surprising the amount of punctures one can stand, and the enormous amount of water that can be absorbed without any infection or abscess formation; indeed, I recall never having seen such a condition in any of the surgical cases that have been under our care. We have given to one case over 70,000 c.c., this method of water intake entirely supplanting that by mouth as the patient resolutely refused to take any water whatever. The usual fluid is normal saline solution, but if there is a nephritis plain tap water is used. We never use glucose or sodium bicarbonate on account of the pain under the skin.

In the following days, the blood urea, total non-protein nitrogen and phenolsulphonephthalein tests are taken at intervals. We have tried only in a few cases the salivary urea, the content increasing with that of the blood. The maximal normal urea and ammonia-nitrogen in the saliva is 16 mg. per 100 c.c. corresponding to 20 mg. of urea nitrogen per 100 c.c. of blood, but in the "oedema form" of nephritis there may be no increase. We have not taken the creatin as a routine laboratory test, only, in exceptional instances.

In a visit to the Mayo Clinic about six or eight months ago I was told in their surgical clinic that they paid but little attention to the phthalein test, basing their opinion upon the patient's recovery exclusively on the blood urea. We try to correlate these two tests and only in a few instances that I recall have we operated when the blood urea was over 30 mg. per 100 c.c. One case, a man who had an interesting urea report, being 35 on admission, immediately going to 75 following the suprapubic operation, dropped to about 50, remained there for six weeks or so, and with the greatest care, hypodermoclysis, encouragement, and salt free diet, was finally reduced to 36 in three months, at which point we operated. We have found a pretty good rule to be, when the low phthalein test rises sufficiently to cross the descending urea line that operation is safe. In another instance in which there has been an uremic state for several weeks, with a blood urea between 75 and 100, this gradually dropped into the 20's and the phthalein test, which was absent on numerous occasions rose sufficiently to give a slight stain around 10 per cent, and at this point, three and a half months following the cystostomy, we operated, the patient going on to a happy outcome. We certainly possess no mechanical calipers, tuning forks or measuring line to absolutely standardize and determine the positive outcome of the patient. This prediction is influenced by phy-

sical examinations, repeated laboratory observations and experience, "For all experience is an arch, where—through gleams that untrodden world, whose margin fades forever as we move",—but it has interested me that the tottering frail body of three-score years and ten, can, with care, gentleness, frequent examinations and snappy operation, make a convalescence gratifying to the surgeon and to the family. I have seen on several occasions the hiccoughing, delirious patient, with the dry, coated tongue, extreme vesical distention, bounding pulse and hammering heart, make a good recovery which, I do not think it unfair to say, fifteen years ago would have been doomed to an oblivious euthanasia.

The patient then having had the suprapubic operation and laboratory test reported upon, it is our rule at as early a date as possible to go on to the radical enucleation, which is on an average of seven days, if we disregard some exceptional instances which show one case of one year, another of seven months, and another of six months lapse of time between the cystostomy and the major operation. Under nitrous oxide anesthesia the prostate is enucleated by the intraurethral method, as brought out by Bentley Squier, of New York, and one of two measures adopted to control the hemorrhage.

1. Ceanothin, an admirable hemostatic, is given in 4 dram doses, 40 minutes and 10 minutes before operation. If at the time of the enucleation there is but little hemorrhage, a large No. 20 French catheter is put in through the urethra by an inserted sound, the eye having been threaded with a heavy silk suture which stays above the suprapubic wound and tacked to the skin so that the catheter can be moved up and down at will, even replaced if necessary later on. Care is taken at the time of the operation to see that there are no tabs or tags left hanging free from the prostatic rim which may later on cause considerable urinary inhibition, even incontinence. I recall a prominent case from a neighboring state in whom, unfortunately, a tab was left and who continued his incontinence for several months, finally having the tag removed by another surgeon in his own state to his great relief and comfort. At the time of the operation, likewise I have found, with the supporting finger in the rectum, it is advisable to squeeze down or press firmly upon the prostatic rim with the operating hand, believing that the hemorrhage is in a measure controlled by this pressure, and, although I do not know of any case that we have lost in the last few years from hemorrhage, I say frankly that I am constantly on the alert about the physiological state of a severed artery or vein being mechanically invited to pour out its contents, and I cannot see any excuse for any surgeon, under any conditions, allowing a case to bleed to a desperate state, when packing, pressure or ligation and care should avoid such a fatal outcome.

2. In the event the bleeding is free (and I have frequently noted that the longer the time between the operations, apparently the greater the hemorrhage), Hagner's bag is used, blown up tightly, pulled down and held in place by our wire perineal support. With this bag I feel at my ease that no alarming hemorrhage can occur. I do not altogether understand how other surgeons ignore the constant loss of blood from the lacerated periprostatic plexus. I have heard several say they use no bag, no packing, no hemostatic control of any kind, simply returning the patient to bed. I do not know how they do it. Since preparing this article I have lost a patient, aged 75. His laboratory report was satisfactory, he stood the enucleation well, and eight days later started up a hemorrhage which proved fatal. The Hagner bag had been removed on the fifth day.

The convalescence of the patient should be pretty well established in two or three days. We have never attempted the grandstand stuff of having them up in a rolling chair the day following the operation, but, rather, allow the old man to take his time, express his desire for food, and what he wants; as long as the circulation continues good, there is no danger of pulmonary embarrassment and we believe that the quieter he keeps the better, thereby encouraging an early union of the suprapubic wound. In one case, a doctor, there was a complete union of his wound in twelve days and he left the hospital on the fourteenth. This was most unusual, our average time following the operation being twenty-eight days. One rather unique complication at the time of the operation was the almost complete eversion of the bladder through the suprapubic opening by my assistant, the rim of the prostatic pouch being caught by the volsella forceps which were intended to seize the prostate; the bladder was returned to its normal habitat, and I am glad to say the patient made an uneventful con-

valescence. The urethral tube, Hagner bag or large catheter are left in for canalization of the prostatic urethra for six or eight days and then removed, nothing further being done to the urethra provided the suprapubic wound heals kindly. In the event there is a continued leaking from the wound, we feel assured that an urethral stenosis or prostatic tag has occurred, which must be treated by the passage of sounds or by opening up the bladder again and inspecting its floor and the internal sphincter. One case has been operated on four times for a leaking suprapubic wound. This was in a rather frail man whose tissues did not seem to unite properly, there being an inflammatory zone about the old opening which on four occasions had been exsected only to break down again and again and require repeated surgical closure. This last operation, done a month ago, I trust will be the final one.

In some four cases there has been a distinct suppurative orchitis, requiring in one instance orchidectomy. The complication of epidymitis occurs in 18 per cent of all prostatectomies. I believe that in the last year this condition is considerably less frequent than formerly, due possibly to the filling of the bladder with mercurochrome at the actual time of the enucleation, elevation of the scrotum following the return of the patient to bed, and the installation of mercurochrome through the suprapubic wound at intervals into the bladder. Five cases have had a marked phlebitis, three of the right leg and two of the left, one case running a bad septic curve and requiring multiple incisions of abscesses in the leg. Four developed a distinct lobar pneumonia but made good recoveries. But the hypostatic lung is one that we are constantly on the outlook for, due to a slowing down of the blood current, the moderate hemorrhage at the time of the operation, recumbency and the pathology of old men.

It has not been our custom to put any drain retropubically, the bladder being sewed tightly to the abdominal fascia, thus obliterating the space of Retzius. In one case there was a marked suppuration in the space of Retzius, requiring incision in the perineum and the lower abdominal wall. In this instance the old man developed pulmonary infection and died, the personal equation of his resistance being at an extremely low ebb.

The presence of sugar in the urine has occurred seven times in the last 100 cases. This contraindicates any incision, so that the retained catheter is used instead of the surgical suprapubic invasion. Insulin, adjustment of the diet and waiting for the internist to recommend when the sugar retention justifies operation is the usual routine.

Carcinoma.—Twenty-four per cent of all prostatic enlargements are cancerous. Many recommendations have been made about the best way to deal with this most unfortunate malignant state; radical and heroic operations, such as resection of the floor of the bladder, and resection associated with the transplantation of the ureters, are not justifiable. Personally, I do not believe radium implantation either through the suprapubic opening into the prostatic substance, or up through the perineum into the gland proper has shown to be of lasting benefit. The cross-fire of intensive high power X-ray following prostatectomy I consider is the best treatment. The gland is removed as thoroughly as possible. The line of cleavage is at times most difficult to locate; peripheral invasion spells cicatricial barriers, so that but seldom is the gland enucleated "en masse". The post-operative treatment is the same as in the normal adenomatous overgrowths. Four or five days later the cross-fire is started; this is given every three days for four or five applications. The cellular destruction delays union. At times there is a marked hyperpyrexia due to the protein liberation, necrosis and absorption; this is transient. It happens that at the present writing we have eight such cases under observation; one operated on three years ago is at daily work, one due to a sharp recurrence uses the catheters with great relief, and one returns every six months for further intensivity. But few of the cases will observe rigidly the recommendations of the surgeon! One has the incipient metastases just beginning in the pelvic girdle and thigh bones; one has spinal involvement, and three write at intervals that they are enjoying life, able to work, void normally, but have increasing nocturnal demands. All specimens following operation are reported upon pathologically. The early malignant mitosis of central carcinoma is recognized only by serial sections. These cases should likewise be rayed following operation.

In those instances of very marked prostatic carcinoma, acute retention, cachexia, and metastatic uprisings, the suprapubic opening only is made, but even in these instances raying seems to control the inexorable vesical tenes-

mus and pain in the perineum better than any other measure. Opiates are justifiable and indicated, and should be given with a generous hand!

When we recall that "catheter life" offers four years more to live even under rigid aseptic precautions, and when we recall that the mortality in the larger clinics for the suprapubic operation for all classes of cases is about 6 per cent, it would appear from actual statistics that the best outcome the patient can select for his own comfort and prolongation of life is the radical operation, carefully and scientifically carried out.

Grace Hospital.

DISCUSSION.

DR. R. L. PAYNE, *Norfolk:*—I listened to Dr. Bryan's paper on the prostate with both interest and profit. On one occasion I had the opportunity of seeing Dr. Bryan operate on one of these cases, and to those of you who have not had that opportunity I want to say that you have a real treat in store for you, for his technical skill is almost equal to the erudite scholar. About twenty years ago or thereabouts the mortality rate of prostatectomy averaged nearly twenty per cent, and it was due to the fact that we did not know how to compete with the problem of pre-operative preparation. Today the technical problems of prostatectomy have become so simple that almost every operator is skilled in the enucleation of the prostatic gland. Therefore, the main thing that interests us is pre-operative preparation and post-operative care. I am inclined to believe that these two factors are fully four-fifths of our problems.

We handle our problems of prostatectomy in a little different way from Dr. Bryan. A good many years ago we began the irrigations of bladder cases with dilute hydrochloric acid, feeling that this kept down the alkaline urine and phosphatic deposits and believing that it tended to the rapid healing of the suprapubic fistula. In the last ten years we have had no reason to change our opinion of hydrochloric acid in simple dilutions of 1-250 or 1-500, and in looking over our cases we find that our total number of days of leakage after suprapubic prostatectomy is twenty-two. I feel like attributing that to the fact that the wound is kept clean with the acid. Bacteriological studies show that hydrochloric acid has no distinct bactericidal effect, but alkaline urine, as you all know, favors the growth of bacteria.

We do not use Hagner bags. When Dr. Francis Hagner first introduced his bags we adopted them, but I am inclined to think that they make the technic more difficult. It is extremely rare, in our experience, to see secondary hemorrhage. I do not recall, in my 123 cases, to have ever seen secondary hemorrhage, except in carcinoma, as late as the eighth day. I know other men have had it, and I expect to buck up against it some time. In the first sixteen cases of prostatectomy we had one death, a broker eighty years old, who died of pneumonia. We then ran over 100 cases without a death, and within the last few cases we have had two deaths from pulmonary embolism in the house at the same time. That is not as good as Hunt's series, in which he reports 176 cases with one death.

I do not believe that immediate total decompression ought to be done in acute retention except where it is absolutely impossible to get into the bladder by any other method except suprapubic cystotomy. I believe that gradual decompression with an indwelling catheter (if necessary, a catheter put in with a trocar suprapubically) is better, for sudden relief of back pressure brings about acute edema of the whole urinary tract; and this results in anuria, which is the fatal thing in these cases. Therefore, bringing the urea nitrogen down to a reasonable point, as low as it will go, and then determining over a length of time, say a week or ten days, what the normal level is, provides for safety in operation.

DR. A. I. DODSON, *Richmond:*—I think all of us who listened to Dr. Bryan's paper realize that the methods described of preparing and caring for prostatic cases are largely responsible for the excellent results now obtained. I doubt if a series of men of the same age would stand any other operation with the same mortality that they stand prostatectomy. The only way that the mortality is going to be decreased further or the results following prostatectomy improved will be in earlier recognition and treatment. I was impressed some years ago, in attending Dr. Crowell's clinic in Charlotte (he was the first man in my memory to report a series of 100 cases without a death), to notice the number of men who came in and consulted him for frequency and having to get up at night; and I was impressed with the large number of cases he got before complete retention had occurred. Many of the men who report a large number of these cases with very few deaths get hold of a lot of patients before complete retention has occurred. I have found that with the proper care and attention these patients get along all right with an indwelling catheter. During the past month I did five prostatectomies. All of these patients carried an indwelling catheter except one, who had the suprapubic operation done six months ago. The other four had indwelling catheters, one for two months, one about six weeks, the others for about two weeks. They came to operation in good condition. One was operated suprapubically; the others by the perineal method. Other things being equal, I feel that I can get the patients out of the hospital sooner and with less discomfort by the perineal method. We had one patient who voided nearly all his urine on the fourth day after operation.

In addition to hypodermoclysis for fluid, we use five or ten per cent glucose solution by the method recommended by Matas and have found it very helpful.

DR. ————:—I should like to emphasize the indwelling catheter as contrasted with suprapubic drainage, i. e., the one-step operation as against the two-step operation. I understand that the mortality in suprapubic drainage is about twelve per cent. I have not had any trouble getting patients to stand the indwelling catheter if sufficient patience is exercised to get it in the proper position. Then, too, the patient with an indwelling catheter has a sense of well-being and is up and about, instead of being strapped to a tube (or the tube to the patient), and being in a rolling chair or kept in bed.

As to controlling hemorrhage, I feel that gauze packing is good. The use of ceanothin may be good. It has been used in other forms of hemorrhage, I understand, with satisfaction. The American Medical Association has not officially recognized it as yet.

We have had no difficulty, at the end of the ninth or tenth day, in removing the suprapubic tube, the packing having been removed probably on the seventh day, the wound strapped tight and an in-

dwelling catheter put in. The patients do not drain suprapubically at all and are discharged from the hospital about the fourth week. Of course, we all have our little hobbies, but I want to emphasize the importance of getting the patient up out of bed as soon as possible after the suprapubic drainage and keeping him up until the day of the operation.

THE MANAGEMENT OF URETERAL CALCULI.*

By A. I. DODSON, M. D., Richmond, Va.

The management of ureteral calculi is not a problem for the urologist alone. The method by which the stone is to be removed and the damage to be caused by its continued presence in the ureter is often determined by the attitude or advice of the physician who is first consulted.

The majority of stones formed in the kidney pelvis find their way into the ureter. Many of them pass out unaided, and others become lodged in the channel, an immediate and serious menace to the kidney.

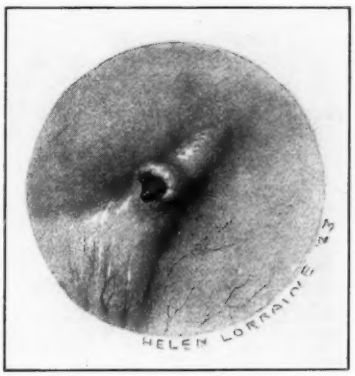

Fig. 1.—Drawing of cystoscopic field showing stone presenting at the ureteral orifice. This patient's only symptom was painful and frequent urination.

The symptoms of stone in the ureter are chiefly those of ureteral obstruction and vary with the location, the duration, and degree of obstruction. I have observed one patient with the stone lodged in the proximal inch of the ureter whose pain was severe in the lumbar region and extended across along the costal margin; and one patient with the stone presenting at the ureteral orifice who camplained only of painful and frequent urination (Fig. 1). It is true that a stone in the ureter can cause severe colicky pain, beginning in the lumbar region and radiating along the course of the ureter and into the thigh or genitalia. There is also increased frequency of urination and blood cells in the urine. It is also true that the initial attack of colic is often the last, whether the stone passes out or not. The stone may remain in the ureter for months or even years, causing very little discomfort. In such cases the kidney is almost invariably destroyed. It is, therefore, very important that a thorough investigation be made following every attack

Fig. 2.—This patient entered the hospital immediately following a severe attack of kidney colic. Cystoscopy showed an edematous, congested ureteral orifice and a small calculus lying just to the right of the orifice. This stone later was passed from the bladder without difficulty.

of pain that may be ascribed to the genito-urinary tract. To treat palliatively cases of urinary frequency, pyuria, blood in the urine and an occasional attack of kidney colic, without insisting upon a thorough investigation to determine the source of the trouble, is often to permit irreparable damage to the renal tissue.

The diagnosis of stone in the ureter depends upon proper use of the cystoscope and X-ray, and, as a rule, is not particularly difficult. About 90 per cent of calculi can be demonstrated by a competent roentgenologist in a properly prepared patient. The addition of an X-ray catheter in the ureter, together with fluoroscopy, stereoscopic films or ureterogram may not only determine the presence of a stone but its size and location. With the exception of very small calculi, the non-opaque stones are readily demonstrated by the ureterogram.

During the past five years I have treated fifty-one cases of ureteral calculi. In four of these, so much damage had been done to the kidney that nephrectomy was necessary. In

*Read at the fifty-seventh annual meeting of the Medical Society of Virginia, at Norfolk, October 12-15, 1926.

eleven instances the stone was removed from the ureter by open operation. In thirty-two the stone passed from the ureter following cystoscopic treatment. Two patients passed the stones unaided (Fig. 2), and one refused treatment. Of the four patients whose kidneys had been destroyed, there were definite histories of discomfort referable to the kidney over a period of from four to seventeen years. The remaining forty-seven patients who had suffered a much shorter period of time, from one day to four months, had likewise suffered very little damage to the kidney. One of these patients had had four severe attacks of kidney colic during two months and when seen there was very definite dilatation of the kidney pelvis and ureter. In three instances the stone was first seen in the kidney pelvis and, following pyelogram or irrigation of the pelvis, passed down in the ureter and eventually passed out. There was a history of having passed stones previously in six cases; and on both sides in four cases. The stone was in the left ureter in twenty-one instances and in the right in thirty-one. In five cases the stone could not be demonstrated on the X-ray film.

In determining the method of treatment of ureteral calculi it is necessary to know the size and location of the stone, the presence or not of infection, the amount of obstruction being produced, and as nearly as possible the condition of the kidney above. Conservative treatment by means of the ureteral catheter, drainage and dilatation of the ureter may be safely prolonged for weeks or months, provided adequate drainage can be assured. Increased experience convinces us of the possibilities of the non-operative cure. By the use of the catheter healthy activity of the kidney may be established and infection adequately treated until sufficient dilatation can be secured for the passage of the stone.

The method I have used exclusively has been the passage of increasingly large catheters or bougies, or of multiple catheters or bougies, up the ureter and, when possible, beyond the stone. When I find it difficult to pass more than one catheter by the stone, I make an effort to pass a second one up to the stone, thereby dilating the ureter below it. I have found that the instillation of a few c.c. of warm olive oil helps materially in the passage of catheters by any obstruction. There have been a number of ingenious forceps, bougies and dilators invented to aid in the removal of stones from the ureter. In my hands most of these instruments are cumbersome and difficult to insert. Many times they have failed to work after they are inserted, and I feel that in the majority of instances they unnecessarily traumatize the ureter, thereby making subsequent catheterization more difficult. The only instruments that have given me help have been the ureteral scissors and the Bransford-Lewis dilator, which I use merely at the orifice (Figs. 3 and 4). It is my belief that equally as much

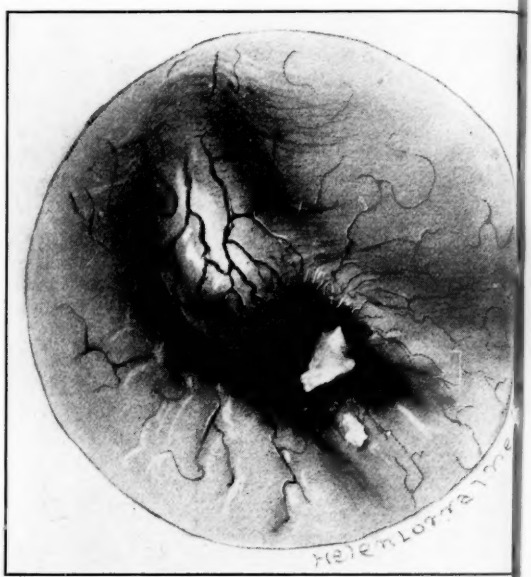

Fig. 3.—Drawing of a cystoscopic field showing marked bulging of lower end of the ureter into the bladder resulting from impacted stone. An incision was made with scissors splitting the ureter for about half an inch. The stone was passed within 24 hours following this operation.

can be accomplished by fairly stiff, smooth catheters or bougies. I frequently find that it is helpful to reinforce the catheter with a small stilette. Once the catheter is passed by the stone, if the patient can remain in the hospital, it is much better to leave it there for from twenty-four to forty-eight hours. By this means the kidney will be drained and irrigation can be carried out for the treatment of infection. When this catheter is withdrawn it is well to immediately insert another larger catheter or two or more smaller catheters. Occasionally after two or more catheters have been passed by the stone, when they are removed the stone will be removed with them. I have had this good fortune on one occasion

(Fig. 5). A number of times I have noticed that the withdrawal of the catheter pulled the stone down in the ureter from one to several cm. In the fifty-one patients treated for ureteral calculi, this method only failed in four. In the remaining fifteen operative cases catheter treatment was not attempted.

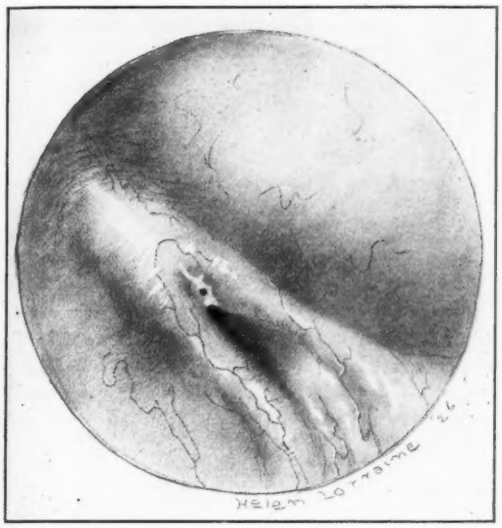

Fig. 4.—Same ureteral orifice drawn two weeks later.

The decision to operate immediately rather than attempt cystoscopic treatment was because there was complete impaction of the stone and inability to pass catheters by the obstruction and the absence of function on that side. The majority of these operative cases were the earlier patients of the series. I believe with more experience and more faith in the method, some of them would not be operated upon if seen now. In a number of instances there was so much edema that the catheter could not reach the calculus and, in a few cases, could not be passed into the ureteral orifices. In such instances as this, plus a lack of demonstrable function of the kidney, I did not feel justified in prolonging the effort and advised immediate operation. Four of these patients operated upon, as previously mentioned, had the kidney removed. It is not always easy to decide before operation that a kidney is entirely worthless and needs nephrectomy, especially when there is a stone wedged tightly in the ureter. Because of the mere fact that a kidney is functionless at the time, it is not indicative that it will remain so. I have seen kidneys that have not secreted for weeks entirely recover function after removal of the obstruction. Occasionally sufficient pyelogram solution can be injected by the obstruction to determine if the kidney is a hopeless hydronephrotic sac. Also, if the catheter is left in place to drain the kidney pelvis, the evidence of an actively secreting kidney will be found within three or four days. Another method that is helpful in these cases is the determination of the degree of compensatory hypertrophy on the opposite side, as demonstrated by dye secretion. As a rule, one normal kidney with the other in good condition will excrete 30 to 35 per cent phenolsulphonephthalein in two hours. If the opposite kidney has recently shut down, the function of this kidney will not be materially altered except in the occasional instance of reflex suppression of urine. On the other hand, if the opposite kidney has been functionless for a long time, the remaining kidney unless diseased itself, will have taken on, to some extent, its function, and we may find a dye output of 50 per cent or more from the normal side. In such cases if the opposite kidney remains functionless over a period of two hours, nephrectomy is usually the necessary procedure. It is my belief that, whatever method is used for removal of the stone, sufficient care is not taken in the after-treatment of these cases. Six of the patients reported in this series were treated for the second stone in the same kidney. Many other series of cases have been reported that show larger percentage of recurrences. The work of Hunner demonstrated without a doubt that ureteral strictures play a part in the formation of stones. The passage of calculi are also considered to be one of the causes of ureteral strictures. Furthermore, very few cases get rid of their stones without leaving behind

Fig. 5.—Sketch of a ureteral stone imprisoned between three catheters. This stone had remained impacted in the upper third of the ureter for several days. The three catheters were passed by the obstruction with considerable difficulty and 48 hours later when they were removed the stone came away in their grasp.

infection. I would, therefore, urge thorough check-up of all patients following the removal of ureteral calculi to determine that the kidney is free of infection, that the ureter is free of strictures and that other stones have not been left behind.

Medical Arts Building.

DISCUSSION

DR. HERBERT C. JONES, *Petersburg:*—I want to impress a few of the things which Dr. Dodson has so ably brought out with regard to the importance of a thorough examination. The last picture shows very clearly what can happen if the stone is allowed to remain in the ureter. Also, I think, as time goes on we are going to realize more and more that all kidney colic is not due to ureteral calculi. Only in the last two or three weeks I have heard doctors say that so-and-so had a case of kidney colic but the X-ray revealed no stone. That patient may or may not have stone; the colic may be due to a stricture or to a stone which will not show on X-ray examination but can only be detected by the cystoscope.

I have been fairly successful in removing stones by catheters. After leaving two catheters in for twenty-four to forty-eight hours, stones pass very readily. I think we are safe in investigating and manipulating stones in the ureter if they are small and the kidney damage has not been too great. However, if the kidney has been practically destroyed and there is a certain amount of obstruction, I do not believe in letting that patient suffer unnecessarily. It is the cystoscope, I think, that the medical profession is afraid of. Our work in this line, I think, will become more easy if every doctor could see a good number of them. Every patient does not make a great deal of fuss on a cystoscopic table, and it is not the dreadful ordeal that I think the average doctor believes it is. I was thoroughly impressed with this fact at the Post-Graduate Hospital in New York the past year. They would cystoscope eight or ten patients in an afternoon. Those patients would be cystoscoped, put on their clothes and go home on the street car. I think the family physician can do a great deal to help the urologist, for a great many examinations are needed to carry out this work and it is up to them to educate the patient to have these examinations.

DR. A. J. CROWELL, *Charlotte, N. C.* (by invitation):—There are a few things with regard to Dr. Dodson's paper I wish to say. First, having been a general practitioner for a number of years, I learned the importance of studying carefully symptoms and learned to interpret signs in arriving at a diagnosis.

I agree with Dr. Dodson that pain and frequency of urination in ureteral stone impaction are very significant. If the stone is impacted near the ureteropelvic junction, the frequency may not be marked, but deep percussion over the kidney will readily differentiate between the faker and one who is suffering with kidney colic. No faker can simulate the pain thus produced.

We treat our cases a little differently from the method described by Dr. Dodson. We stress ureteral anesthesia in cases where we experience undue difficulty in getting the eye of the ureteral catheter by the stone. Frequently the injection of a little hot oil, after anesthetizing the ureter, will allow the catheter to pass the stone more readily. We think it better to leave the retention catheter in two to four days (especially if the stone is located near the ureteropelvic junction), because of the danger of pushing the stone back into the kidney pelvis through the multiplicity of catheterizations. This relieves pain, dilates the ureter, and enables one to lavage the kidney pelvis with antiseptic solutions if infection be present. The ureter should always be anesthetized before removing the catheter and the kidney pelvis filled with warm saline solution.

It is well to lubricate the ureter with oil as the catheter is withdrawn. If the stone fails to pass following such dilatation, the treatment should be repeated with a larger catheter as soon as the pain returns. There is a metallic dilator, gotten out by some instrument company, which we have used very satisfactorily in removing small stones, after the ureter has been dilated thoroughly. It is inserted until the blades pass the stone; the blades are then opened and pulled down until you feel the stone slip between the ribs or blades. The handle is then released and the cable pulled out. We have removed several stones in this way in the first attempt without using the retention catheter at all.

Out of nearly 400 cases of ureteral stone impaction since we devised their removal by cystoscopic manipulation, we have operated upon only about five per cent of them.

THE PREVENTION OF SYPHILIS.*

By DUDLEY C. SMITH, B. S., M. D., Charlottesville, Va.

The prevalence and seriousness of syphilitic disease make it one of the major public health problems. Stokes[1] speaks of the infection as "The Third Great Plague"; Surg.-Gen. Cumming[2] recently read a paper on venereal diseases which was entitled "Guarding the Nation's Health"; Osler,[3] using mortality returns, post-mortem evidence and Wassermann reactions, concludes that syphilis is one of the foremost "killers of men"; and Vedder[4] concludes that with one exception syphilis is the most prevalent of all serious infections. Many more similar references could be given, but all medical men know that syphilis is one of the most prevalent diseases, that it causes an incalculable amount of suffering, mental agony and economic loss. It is a constant danger, not only to the immoral, but to the clean-living public as well. Blaisdell[5] determined that sixty cases of early syphilis which he followed exposed twelve hundred and twenty-seven people to the disease by direct associations.

Osler[3] emphasizes the fact that vital statistics records do not accurately reveal the incidence of the morbidity and mortality caused by this infection. It is only when one studies the data given under other headings that the true situation becomes known. Think of the

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syphilis which is hidden by diagnoses of stillbirth, malnutrition, hydrocephalus, cirrhosis of liver, apoplexy, softening of brain, aneurysm, aortic insufficiency, myocarditis, keratitis, periostitis, chronic ulcer, etc.

Figures made available during the past few years have shown an increase in the importance of the degenerative diseases. A goodly portion of these degenerative diseases are due directly to syphilis or indirectly to the necessary treatment of the infection.

It is indisputable that this problem justifies to its solution the application of money, energy and thought. The anti-syphilitic campaign presents to courageous, wise leaders a great opportunity for improving the public health of the population.

There is sufficient scientific information known concerning this infection to lead one to expect its eradication. The cause is the treponema pallidum. It is communicable by direct contact with an infected person or contaminated object. Clinical acumen, dark-field examinations and Wassermann tests make early diagnosis possible. Therapeutic measures are available which quickly make an infected person non-infectious. The reason no more has been accomplished is, of course, because of its relationship with sex and immorality. If it had been possible to handle the disease entirely as a medical problem, much greater progress would have been made. Consequently, it should now be made as nearly as possible a medical proposition. The efforts in this field of many sincere individuals have hindered instead of facilitated the campaign. The blunder has been in emphasizing the sexual and immoral aspects when medical effort should have been foremost. In other words, the moralist in attempting to help the sanitarian has often, as ironical as it seems, handicapped him. This infection has been so completely walled in and protected by secrecy, ignorance, prejudice and indifference that it could not be attacked properly by medical measures.

Syphilis is a disease, not a crime, nor is it the result of crime in many cases. A child was infected *in utero*, the mother was infected by her husband who was a physician, the physician acquired a chancre of the finger from a female patient with mucous patches in the mouth, the patient was infected by her husband who thought he was well before marriage of an infection the result of environmental influences in early life. Is this crime?

Sexual transmission has a physiological basis. The environment about the genitalia happens to be such as is conducive to the growth of the treponema pallidum.

When one begins to formulate a plan for the eradication of this disease, immediately the fact is presented that the entire population must be considered. The population can be divided into two groups: first, those who are susceptible to infection, and, second, those who are already infected. The latter group form the foci of infection. The objective is to prevent the transfer of the viable germ from the diseased individuals to the susceptible individuals. Measures relating to both of these groups can be used advantageously.

The main source of transmission is by sexual contact; this may be immoral or legal. It may be contracted by direct extra-genital contact and by intermediate contact by way of contaminated objects. The incidence of extra-genital transmission is a more important factor than was formerly thought. Congenital transmission is another source.

Measures pertaining to the well individual will be considered first. Universal continence except in marriage would be the most potent means of preventing the spread of this infection, but this desirable state seems far ahead. Every effort should be made by religious and ethical training to raise moral standards. The living of a virtuous life is the surest way to avoid syphilis. Most everyone will agree, though, that it is a smaller task, and quicker of accomplishment, to eradicate syphilis than to eliminate immorality.

Widespread education regarding the prevalence, cause, prevention and course of the disease is essential to successful prevention. An awakening of public opinion is necessary. When any disease receives universal publicity, it loses much of its ability to spread. If the population knew that about one in every three syphilitic infections were acquired innocently, the attitude would be improved. The teaching can be done by the educationalist, clergyman, newspaper editor and reporter, reformer and scientist.

It is worthwhile to note that many physicians need to be educated regarding means of diagnosing and proper methods of treating syphilis. The medical aspect of the problem is of such proportions that every specialist and general practitioner should be enlisted. These should acquire special knowledge concerning

the methods of locating and eliminating foci of infection. That foci are so numerous is the reason for enlisting the aid of all medical men. It is not suggested that all know how to do Wassermann tests, dark-field examinations, etc., but they should know the significance of the modern methods of diagnosis. More physicians with proper understanding of the principles and technique of treatment are needed. These should also be willing to do more charitable work in this field. More treatments for smaller fees would be an improvement.

The establishment of wholesome recreations and entertainment which will absorb leisure hours will decrease the tendency to sex adventure. Social and judicial measures which tend to decrease licentiousness should be rigidly enforced. All forms of prostitution should be vigorously combated. The two sexes should be punished equally. Chronic offenders are best handled by probation officers and industrial schools. When social conventions and legal procedures make the risk of promiscuousness liable to severe ridicule and punishment illicit relations will decrease.

The use of medical prophylactic measures has aroused much discussion. It has been definitely proved that the application of calomel ointment to the genitalia shortly after exposure will prevent the infection in the majority of instances. Intra-vaginal injections of treponemicidal agents before exposure is a successful prophylactic. Other measures classed as personal prophylactics are more or less effective. From a scientific point of view these measures can be classed along with the most successful preventives of disease. Ethically there seems to be no difference between personal prophylaxis and treatment after infection. Medically there is much difference. Widespread knowledge regarding personal prophylaxis for syphilis will not increase immorality. In the first place, fear of disease does not increase continence, and, in the second place, good habits based on fear is not morality.

The problem of eradicating syphilis as it relates to the infected individuals can be briefly stated. Discovering all these foci and making them non-infectious will solve the problem. When this is done, syphilis will be eliminated regardless of low moral standards.

Every genital and many extra-genital sores should be examined for treponema pallida as soon as they appear. Facilities and training in diagnostic methods, as said before, should be more generally available. All cases of early syphilis should be isolated. Hospitalization is the best means of isolation, but not compulsory for intelligent patients. Personal instruction as to how the infected individual can prevent spreading the disease is important. More important is early vigorous treatment. A few injections of arsphenamine renders a syphilitic non-infectious and proper treatment should be continued until a cure is obtained. Proper treatment, associated with conditions agreeable to the patient, should be easily available in every community. The charges to the patient should be commensurate with his ability to pay. No case should be allowed to go untreated or to stop treatment before cured. By tactful handling most patients will continue treatment voluntarily; the others should be handled by legal measures.

Extensive use of the Wassermann reaction will locate many cases of infection. This test is not infallible, but it is thought by some to be the most important single laboratory procedure in medicine. The State Board of Health should be commended for making this test available to all physicians, thereby aiding in eliminating a communicable disease.

The early recognition and proper treatment of syphilis in pregnancy will prevent most hereditary syphilis.

Every case of syphilis diagnosed presents an opportunity for locating other foci of infection. By social service follow up, or better called "follow back" measures, other cases of syphilis are found. The "follow back" should include not only the family but all other associates.

Other measures dealing with the infected individual which are of some importance are: reporting of the disease to health authorities, promotion of health certificates for marriage, and improvement in housing and living conditions.

In concluding, it should be emphasized that syphilis is a formidable enemy of the race, entrenched behind secrecy, ignorance, passion, prejudice and indifference, but, by means of an awakened public opinion and an energetic well-trained medical profession, an offensive is being launched which will win the campaign.

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DISCUSSION

MAJOR H. L. FREELAND, M. C., U. S. A., *Richmond*:—I should like to emphasize one thing the speaker brought out, and that is that we should consider every patient a potential syphilitic in making our diagnosis. That may be putting it rather strongly, but I had a personal experience early in my medical career which made me throw away any scruples I had to the contrary. A patient was received in the hospital, mild-mannered, soft-spoken, with every indication of being a lady, and probably she was. The case, as I go over it now, gave every indication of being one of syphilis; but as a young intern, it never occurred to me that she might have syphilis. I conveyed my feeling to a senior intern, who probably realized my feeling, and he said: "Probably you have a case of syphilis." To my great chagrin—for I did know better—I realized that it was syphilis. Not every case shows as typical symptoms as did that one, but most often they have some one symptom or several symptoms which will lead us to the diagnosis.

Experience in the Army has standardized the Wassermann for us.

DR. ROY K. FLANNAGAN, *Assistant State Health Commissioner, Richmond*:—I can not let this paper pass by without acknowledging my pleasure in having heard it, for I think this society is to be congratulated upon having the prevention of syphilis presented in all of its phases in such a concrete and satisfactory way. Little remains to be added in its discussion except to emphasize several points of it. Every physician should suspect syphilis in his patient. Everybody is susceptible to it; it does not mean any particular reflection upon anybody to make a Wassermann. It should be done in every case. In fact, I had it done upon myself recently when I was sick, not only blood Wassermann, but spinal fluid. Every doctor that practices for a number of years is laying himself open to infection. A doctor is not doing his patient justice unless he considers syphilis among the possibilities. We have to get down to modern methods. We know a great deal about this disease that we did not know in days gone by, and we should make use of this knowledge. In every city of any size in the State of Virginia there are clinics, generally good clinics. In many cities they are under the local boards of health, but, whether under the boards of health or not, their doctors would be delighted to have the general profession come in and observe, for instance, the method of administering arsphenamin. Many of you doctors have not acquired a thorough knowledge of the technic of administering arsphenamin. It is something you ought to know, for you can not with impunity chuck something into the veins of patients without knowing the technic. I commend these clinics, which were established during the war by my predecessor, Dr. Brumfield, whom I notice in the audience. He is to be congratulated for developing these excellent clinics and making it possible for the poorest and worst type of infected persons to get treatment. Many doctors in the State do not know about these clinics and do not regularly administer this drug. I hope that a more general interest in the subject will be aroused by the reading of Dr. Smith's paper and that it will be widely circulated, for the number of sufferers from syphilis is large, and the only way it can be controlled is by the general practitioner recognizing the disease and giving modern treatment until the patient is not only symptomatically well but actually well.

DR. W. B. MCILWAINE, *Petersburg*:—Speaking of the prevention of syphilis, I want to bring out the point that it is largely in the hands of the general practitioner. I will cite one case. A father brought his child to me, and the child was apparently well. He brought the second child to me eighteen months later, and that child had a definite case of congenital syphilis. When I informed the father, he was thunder-struck, of course. He told me that he had had syphilis before marriage, but had been told he was cured and could not transmit it to his children. If that man had been told that he should have repeated tests, even after apparent cure, and that as soon as his wife became pregnant she should have a Wassermann made, that child could have been saved from syphilis.

DR. ST. GEORGE T. GRINNAN, *Richmond*:—In the hospital in Richmond we have had a practice for a long time of using sulpharsphenamin in syphilitic children—not intravenously, but hypodermically. The smallest dose on the market is .075 grammes, which is easily used in two centimeters of water. That is given for about a week, then a rest for two weeks, then it is given again. We have been able to get negative Wassermanns in these children after treatment. In the city of Richmond now the children's syphilitic clinic, of which there are a large number in certain sections, are gathered together, and the nurses that we train in our hospital go there and we can clean up whole districts which would otherwise result in syphilitic children. It used to be supposed that it would take three or four years and prolonged rubbing, but that idea has been discarded. We can use either the Wassermann test or the Kahn test.

DR. ————:—I think we should take account of our own stock sometimes, inasmuch as we all see patients sometimes with paresis or some degenerative condition of the heart or some other part of the body, and the patient says: "I stopped treatment because Doctor So-and-So charged me so much for the treatment that I could not go on." I think if you would make your fee as small as possible and consider the ability of the patient to pay, you would be aiding the health of your community.

Another point is that I think we should endeavor to learn more about this disease. It is said, "If you know syphilis, you know medicine." We have had children brought to us, of whom the family doctor said that he did not know children could have syphilis so young.

DR. SMITH, *closing the discussion*:—I like to think of this as a purely medical problem. Of course, the other side has to be emphasized, too; but that is not our business; that is someone else's business. If we make it a purely medical problem, we can do more with it. The general physician's threshold of suspicion (quoting from Stokes), in regard to this disease, should be increased. Many physicians have a horror of thinking about this disease and are slow to suspect it in their patients. The threshold of suspicion should be increased. I would not be willing to agree with the statement that sulpharsphena-

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min alone can be relied upon for cure of congenital syphilis. Again, the technic of medication, while not simple, is simple enough for the average physician to handle, and I think it would be preferable for the general practitioner to handle it. Of course, the venereal disease clinics do a lot of good, too; but I want the higher element of society to get the benefit of this knowledge just as much as the lower element. The private patient should be suspected just as much as the charity patient. Treat them and charge them for it, and charge the charity patient what he can pay and have him continue treatment. In that way the foci of infection will be eliminated.

CORONARY OCCLUSION—CLINICAL OBSERVATIONS.*

By T. DUCKETT JONES, B. A., M. D., University, Va.

Little, perhaps, did Herrick[1] realize the far-reaching results which would follow his report in 1912 of the clinical features of sudden obstruction of the coronary arteries. To him goes the distinction of being the first American clinician to call attention to a series of symptoms and findings, today so widely known, and of such an impressive nature as to make us wonder that the syndrome was not long ago recognized as a distinct clinical entity. The past decade has evidenced many productive contributions, which give us a very definite clinical picture, and a wealth of detail concerning the condition. I do not mean to convey the idea that the condition had entirely been overlooked previously, for Von Leyden, Marie Huchard, Krehl, Dock, Osler, and Mackenzie presented unmistakable pictures, these usually being included under reports or discussions on angina pectoris. While the condition has not been an entirely neglected one, it has nevertheless been a comparatively short time since the medical profession has been generally enlightened, or rather since the syndrome has been popularized.

To review the clinical syndrome may seem unnecessary, but doubtless by repetition alone will we finally become so familiar with this or any other entity, that we subconsciously consider it as a possibility in any unusual or suggestive case. The variations are many, and it is the object of this short discourse to present merely very broad aspects with reference to some of the more important differences. Acute or sudden occlusion of a large coronary vessel, resulting as it does in infarction of the heart muscle, will be considered for the most part. Hence, thrombosis is the main consideration, though an occasional embolic case occurs, and blocking of the coronary orifices by syphilitic aortitis gives the same picture. This is distinct from those cases having complete gradual closure with slight, if any, change in the myocardium, and with little disturbance of function.

*From the Cardiac Clinic, Massachusetts General Hospital.
Read before the fifty-seventh annual meeting of the Medical Society of Virginia, at Norfolk, Va., October 12-15, 1926.

The Clinical Syndrome

Symptoms must vary according to the suddenness, the completeness, the size and location of the artery, the collateral circulation, and the area functionally lost, as stressed by Herrick.[2] Occlusion of a large vessel only, results in the following chain of events:

(a) *Pain.* The pain is of extreme severity, coming on often out of a clear sky, even waking the patient from sleep. In others it follows slight or ordinary exertion, a moderately heavy meal, an operation, or some unusual emotional strain. In many of the cases there is a previous history of angina pectoris over a period of months or even years, while in others the patient may be felled who has never had any symptom referable to his cardiovascular system. Thirty-two of White's[3] sixty-two cases had angina pectoris prior to the coronary accident. The character of the pain is striking, being described variously as constricting, pressing, boring, burning, sharp, dull, or cramp-like, and it may or may not radiate to the back, neck, shoulders, or down one or both arms. Not uncommonly it has been described as status anginosus, or status gastralgicus, when epigastric in location, as is common. There is a sense of impending death, something entirely different from anything the patient has ever experienced, though he may even have had angina pectoris. Rarely is the pain intermittent, but constant, lasting for hours, even days, unrelieved by nitrites or rest, and often even by massive doses of morphia.

(b) *Shock.* Concomitant with the pain, there is as a rule a pronounced degree of shock, with prostration, a fall of blood pressure (often below 100 mm. of mercury), and a suppression of urine.

(c) *Dyspnea.* Occasionally dyspnea is the only initial symptom, pain being slight or absent. It is associated, of course, with the myocardial damage and insufficiency. At times, dyspnea does not occur until the pain has begun to subside, but early appearance is

the rule, coming on with the other signs of failure.

(d) *Pulmonary Edema.* Pulmonary edema always occurs to some degree and as a rule is extensive. The rapid appearance of pulmonary edema should make one think quickly of a coronary accident.

(e) *Appearance.* The peculiar color and appearance is typical. The face is ashen-gray in color, the features pinched and evidence seen of intense suffering and mental anguish. The skin is covered with cold perspiration. As failure develops, cyanosis, enlarged liver, albuminuria, and subcutaneous edema occur. Cheyne-Stokes respiration is usual during the course of the resultant myocardial insufficiency.

(f) *Heart.* The cardiac impulse is diffuse and weak, the heart sounds faint and often indistinct; gallop rhythm may be present, a more or less distinct systolic murmur may be heard, and many cases show some abnormality of rhythm. Of these arrhythmias, the commonest are premature beats, auricular fibrillation, auricular flutter, heart block, and paroxysms of tachycardia.

(g) *Electro-cardiograms.* Electro-cardiograms have been of distinct help in determining the true nature of these irregularities, often impossible to be unravelled clinically. Likewise, they have proven to be of value in the diagnosis of difficult cases. I have recently reported a case showing atrioventricular rhythm, with nodal bigeminy at times, and in addition to this also idioventricular rhythm, and on occasions an ectopic auricular tachycardia. It does not seem surprising that such irregularities occur, dependent upon interference of the blood supply either to the sino-auricular or auriculo-ventricular nodes or main branches of the bundle of His, or as a result of the localized infarct.

Symptoms the Result of the Myocardial Infarct. Fever, usually 100° to 102°, associated with a leucocytosis (12,000 to 25,000) as a rule are present, and vary with the extent of infarction. McNee[4] considers a localized pericardial friction rub, in association with a suggestive history, a pathognomonic sign. When present, it is of extreme importance, but its absence cannot be regarded as any evidence against the diagnosis, since its presence depends upon too many varying factors. Wearn[5] found it present in two of nineteen cases; Hamman[6] in one of ten; Wolff and White[7] in nine of nineteen; and Longcope[8] in no case of his sixteen. Embolic phenomena occur also, being dependent upon the infarct. They were present in two of the nineteen cases of Wolff and White[7]. Cardiac aneurysm with rupture and sudden death may follow—weeks to years later.

Differential Diagnosis

Few clinical pictures give the striking syndrome which typical cases of acute coronary occlusion show. However, as in most conditions, no absolute rules can be formulated, and puzzles will continue to present themselves. I recently saw an autopsy performed on a man 63 years of age whose history and findings were almost identical with the classic picture. The only differences were that his pain was entirely in the back, the fall in blood pressure was all but instantaneous, and he had a sensation of pressure low in his perineum. Autopsy revealed the rupture of a small aneurysm of the left common iliac artery with retroperitoneal hemorrhage. Possibly with the most careful analytic study, some diagnosis other than acute coronary occlusion might have been made, yet the mass of evidence was in favor of its occurrence. Such cases are rare, but should make us pause in too quickly diagnosing cases, though at first glance they may seem very evident.

1. *Angina Pectoris.* Angina pectoris is by far the most frequent differential problem, and yet there are certain criteria which, if followed carefully, will render the correct diagnosis possible. The pain of angina is of short duration, relieved by nitrites or rest, not associated with a fall but rather a slight rise in blood pressure, and the pulse rate is not markedly altered. The signs of acute failure do not follow closely as is the case in cardiac infarction, and, in fact, the two present rather converse pictures. Border-line cases are disturbing. The diagnosis is difficult in some cases which we designate clinically as coronary sclerosis. These cases show, as a rule, peripheral arteriosclerosis, cardiac enlargement with or without hypertension, symptoms referable to lowered cardiac reserve, and usually electro-cardiographic abnormalities, such as intraventricular block or T-wave changes. Substernal or precordial pain on exertion is common, and, when individuals with such syndromes develop failure, we must not forget the possibility of coronary occlusion as a

factor. The vessel occluded may be small or the process so gradual in onset that many of the cardinal symptoms are absent. Wearn[5] has stressed the difficulty of making the diagnosis when it occurs in cases with myocardial insufficiency, and believes that in such cases with arteriosclerotic disease, any sudden aggravation of symptoms should arouse suspicion. In most instances it occurs in late adult life, since it is associated with sclerosis of the coronary arteries. It is uncommon before 50 years of age, and rare below 40, though Jamison and Hanser[9] recently reported its occurrence in a youth of 18 years.

2. *Cholelithiasis.* Cholelithiasis may often present its difficulties of differentiation. Faulkner, Marble, and White[10] have given a good comparative study of the two groups. The chief diagnostic points in favor of cholelithiasis are the predominance in this group of females, often under 40, a history of similar attacks over relatively a long period of time, and radiation of the pain to the back, if it radiates at all, rather than upward and into either arm. Supporting coronary occlusion, they found its predominance in males over 50, a history of angina pectoris, the feeling of constriction never experienced in cholelithiasis, the frequent upward radiation of pain, often into the arms, and electro-cardiographic changes.

3. *Perforated Ulcer.* Perforated gastric ulcer will less often prove confusing. In such cases, the age of the patient, history of angina pectoris, or previous digestive trouble, radiation of pain, presence of signs of cardiac failure, and local abdominal findings of perforation should render a diagnosis possible.

Prognosis

Little need be said concerning the mode of death. Fulton[11] has recently discussed this and believes there is good reason to suppose that ventricular fibrillation is the most common cause of sudden death, considering also heart rupture, pulmonary embolism and heart block. Many cases die as a result of myocardial insufficiency at varying intervals after the onset. There are no hard and fast rules. Death may occur instantaneously, or, following a stormy course and long convalescence, the patient may survive a few years and return to his normal status. It is this latter group which makes it desirable to establish a correct early diagnosis, for it seems fair to suppose that some avoidable accidents might be averted, and the prognosis rendered more favorable. Of the 160 cases included by Mackenzie[12] in his monograph on Angina Pectoris, eighteen had undoubted coronary occlusion. Of these eighteen cases all are dead but one, averaging three years after the onset, with wide variations. Of the nineteen cases of Wolff and White[7], the duration of life was determinable in eighteen: seven hours or less in four cases; seven days or less in four; several days or less in seven; four to five months in one; eight months in one; and five years in one. Levine[13] has reported five cases that recovered and were restored to previous activity without trouble. Of the sixty-two cases recently cited by White[3], thirty-two are dead, living an average of fifteen and one-half months after the accident, with limits between a few hours and seven years; thirty are yet alive, averaging twenty-four months. Poor heart sounds and congestive failure added gravity of prognosis to this latter series, and pericarditis was more frequent in the cases that died. The following clinical findings, occurring soon after the accident, render the prognosis favorable:

1. Defervescence of fever and leucocytosis; 2. Rise in blood pressure; 3. Improvement of heart sounds and electro-cardiographic findings; and, 4. Decrease in congestive failure.

Treatment

Prompt recognition of the accident may promote recovery by emphasizing the value of prolonged rest. This should be carried out over a long period of time (at least four weeks in bed), despite marked clinical improvement and the desire of the patient to return to activity. In those cases responding to therapy, the period of rest greatly influences the functional result. Massive doses of morphia to relieve the pain and aid in rest are essential. Digitalization is an undoubted aid in every case.

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DISCUSSION

DR. T. DEWEY DAVIS, *Richmond:* I was very much interested in this paper by Dr. Jones, and there are two points I wish to emphasize in connection with coronary occlusion. One of these is that the pain is not necessarily acute and agonizing in the early stages. Illustrative of this, I had a patient who was taken with a typical attack one evening soon after dinner. (He was off on a fishing trip). He had all the symptoms, pain, sense of constriction, etc., but the pain was not agonizing; and he got by by taking a little soda and vomiting a few times. The next morning he drove his car fifty miles to his home. After reaching home the pain continued, and he was given three hypodermics of morphin (each time a quarter of a grain, he said) for relief. His doctor saw him about two P. M. He had then some fever and leucocytosis. He improved very much, and I saw him about six weeks later. At that time he had the peculiar finding in the electrocardiogram. It is hard to describe it without an illustration, but it is a peculiar convexity of the T-wave which is very characteristic, according to Pardee. I think it is of great importance in the diagnosis of these cases. The two points are that the pain is not necessarily agonizing and may not give that sense of early impending death, and that the peculiar configuration of the electro-cardiogram is of great importance.

A REPORT OF TWO CASES OF PERFORATION OF DUODENAL ULCER IN THE HOSPITAL.*

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When, one year ago, a prominent surgeon read a paper before this Society, advocating the medical treatment of peptic ulcer, his conclusions were, to some of us, more spectacular than convincing. However, the paper and the discussion which followed served to focus our attention on a very important subject, and caused us to make a mental audit, as it were, of our present methods of treatment. The result was good.

It is not my purpose to detract anything from the credit that is due the medical men for the very excellent work which has been done in the management of peptic ulcer. It is undoubtedly true that many ulcers heal under medical treatment, and some get well without treatment. Even with the cases which come into the hands of the surgeon, the cooperation of the internist in the pre-operative and post-operative management is invaluable. Without any purpose of being controversial, it has seemed to me that there are certain types of ulcers and ulcer complications which place this lesion rather definitely in the field of surgery.

Lahey[1] has, I think, classified rather conservatively the cases considered unsuitable for conservative treatment. They are as follows: "Those with any question of malignancy; those, of course, with perforation; those in which symptoms cannot be relieved in seven days; those in which occult blood cannot be made to disappear from the stools in fourteen days (eliminating blood from other sources); and pyloric stenosis." I agree with this classification except that it is my own belief that an ulcer which has resulted in a frank hemorrhage should always be treated surgically as soon as shock and acute anemia can be overcome. If at all safe and practical, such an ulcer should be destroyed at the time of operation. In addition to this, there are many individuals who for economic reasons cannot afford the long stay in the hospital which a medical cure sometimes involves.

Meyer, writing in the *Bulletin of the Chicago Medical Society*, has reported a series of sixty-two cases of acute perforation of gastric and duodenal ulcers, proved at operation. Every one of these patients was a male; 60 per cent of them were under 40 years of age, and 32 per cent were 30 years of age, or younger. In other words, the ulcer victim is the bread-winner of the family.

It is probably true that duodenal cancer is a rare condition. Many clinicians refer their gastric ulcers to the surgeon and treat medically the ulcer on the duodenal side, on account

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1. Surgical Clinics of North America, 1926, 6, 698.

of the relative immunity of the latter condition to malignant changes. However, Eusterman, Berkman and Swan[2] report fifteen cases of primary carcinoma of the duodenum, diagnosed at the Mayo Clinic. There is also quite a general impression prevailing among the medical profession that a patient rarely bleeds to death from a dudodenal ulcer. It is my own belief that this tragedy occurs much more frequently than one would be led to believe from reading the current medical literature on the subject.

There is another very interesting circumstance connected with duodenal ulcer which has an important bearing on this subject. Men who have had large experience in the operative treatment of ulcer rarely find an uncomplicated duodenal ulcer as the sole intra-abdominal lesion. The lymphatic vessels supplying the duodenum, the gall-bladder and the appendix are very intimately connected, one with the other. It is fairly safe to say that a majority of chronic duodenal ulcers are complicated by a diseased appendix or by cholecystitis. Sometimes all three conditions are present at the same time. Not infrequently, one finds crippling adhesions between the duodenum and the gall-bladder and liver, as a result of a penetrating duodenal ulcer. All of these associated lesions are admittedly surgical. When the patient's ulcer is treated by operation, this additional pathology can be cared for at the same time and through the same incision. While treatment of such a case medically may perhaps cure the ulcer, it will not cure the patient; and the symptoms due to the concomitant lesion will remain to torment him still.

During the past March, I had two cases of peptic ulcer under my care at the same time, both of which perforated in the hospital. There were certain circumstances connected with this occurrence which made such a dramatic impression on me that I have thought it worth while to put these cases on record, as a warning of what might happen to such a patient while waiting for a medical cure.

Case No. 12332: Male, age 39; admitted February 23, 1923, complaining of stomach trouble for 3 or 4 years. Bright's disease, stomach trouble, typhoid fever and pellagra occured in the family history. Tonsillectomy was performed in 1919 after a long history of tonsillitis and quinsy. Otitis media had continued since tonsillectomy. He had had a desperate illness with typhoid fever 12 years before his first admission. Earlier still, he had had scarlet fever and pneumonia; and since had had influenza. Had drunk much liquor. Had lost 30 pounds on second admission. His immediate complaint was the typical ulcer history, the periods of stomach discomforts occurring now more frequently, and for the past 60 days he had been free only about two days. Had vomited food eaten two days before. Not certain that stools had been black or bloody. Vomiting at periods for a year.

Examination essentially negative, except the following point: Bilateral deafness, worse on right side; marked pyorrhea and caries; pulse 80; blood pressure 130/80; temperature 98.2. Abdomen moderately distended, especially the epigastrium. Indefinite peristaltic waves, left to right across epigastrium. Tenderness over stomach. Hemoglobin 65 per cent. Normal white and differential. Normal urine. Stool not reported by laboratory. Fractional gastric analysis: High curve; total acid 130; free acid 75.

Clinical impression: Acute peptic ulcer with pyloric obstruction; chronic appendicitis; chronic otitis media; chronic rhinitis; oral sepsis.

Roentgenological report: Lesion in first part of duodenum, involving the pylorus, producing marked obstruction. Stomach markedly dilated.

The patient was advised of his condition and of the necessity for operation. He left the hospital to arrange his domestic affairs. He got as far as a down-town hotel, when he had an attack of severe abdominal pain and vomited all night. He was re-admitted the following morning. He was then in terrific pain. His abdomen was board-like in its rigidity, all over. His temperature was 102. Leucocytes 20,200. The diagnosis of perforated ulcer was made without hesitation, and he was immediately operated upon.

A large amount of brown fluid was found in the cavity. A large, indurated ulcer, with a perforation in its center, admitting the tip of the index finger, was found just outside the pyloric ring. The stomach was much distended. The perforation was sutured, reinforced with an omental graft, and a posterior gastro-enterostomy was done. Proper peritoneal toilet and drainage was provided.

2. Annals of Surgery, July, 1925.

The patient made an uneventful recovery and was free of ulcer symptoms upon his discharge.

The second case (No. 12384) was a man of 30 years, admitted February 25, 1926, also complaining of stomach trouble of two years. On previous examination, chronic tonsillitis, cardiac hypertrophy with hypertension, and chronic appendicitis had been the diagnosis. For two years, at least, before admission, the patient had been complaining of rather typical pains limited to a small spot in the epigastrium, of a gnawing character, relieved by eating simple foods and by soda, and characterized by periodic exacerbations and remissions. No vomiting and no black stools.

Examination was without interest except as follows: Enlarged, diseased tonsils. Temperature normal. Pulse 74. Blood pressure 114/72. Abdomen not distended, soft and relaxed. In the mid-epigastrium, slightly to the right of the median line, there was slight tenderness on firm pressure. There was minimal tenderness, also, at McBurney's point, without muscle spasm.

The impression from the examination was pretty positively in favor of peptic ulcer, though it was realized that chronic appendicitis with pylorospasm and hyperacidity could produce the same train of symptoms. Tonsillar infection was present.

The blood and urine were negative.

Fractional gastric analysis showed a high curve: total acid 134; free acid 86. Stools were negative for occult blood.

The roentgenological examination failed to reveal any filling defect in the stomach or duodenum, or any obstruction at the pylorus. The appendix was visualized, adherent along the mesial side of the cecum, and tender. It was the opinion of the roentgenologist that the stomach symptoms could be accounted for by the appendix.

The patient was a dentist. He was advised of the doubt in regard to a peptic ulcer, and was advised to accept an exploratory incision that the doubt might be cleared up as his appendix was removed.

Upon re-admission to the hospital on March 10, 1926, this advice was twice repeated; and again after he was on the operating table he was advised to have the upper abdomen explored. He persistently declined the advice, believing that the appendix was the whole trouble.

At operation, a definitely diseased, adherent appendix was found lying high up behind the cecum, and there were numerous bands of pericecal adhesions, producing partial obstruction. These bands were released and the appendix removed without incident. The wound was closed without drainage.

His post-operative course was normal until the following morning, when he had temperature of 103.4, with what he called gas pains. At this time a mild epidemic of influenza was prevalent in the community, and there were cases in the hospital. A medical associate expressed the opinion that the complication was influenza. By the next morning, the patient had developed an effortless vomiting of large quantities of green fluid without nausea. The upper abdomen was greatly distended. His leucocytes were 9,400, with 67 per cent polys.

We hoped, therefore, with the normal blood picture and the characteristic epigastric distention, that the condition was acute gastric dilatation. We resorted to frequent lavage.

It was not until afternoon of the second post-operative day that we began to realize the tragic significance of his symptoms, and to suspect that he had a perforated ulcer. By this time, his condition was so extreme that operation was considered useless. He died early the following morning, the third day after operation.

Autopsy revealed a small ulcer on the posterior surface of the duodenum, which had perforated into the pancreas.

It is with considerable chagrin that one stands before this Society and admits that an ulcer perforated with the patient in the hospital under his very eyes, and went unrecognized for twenty-four hours. We offer no excuses; but perhaps there are some mitigating circumstances: the negative X-ray findings; the prevailing epidemic of respiratory infection; the normal white blood count; and, finally, the very unusual circumstance of a peptic ulcer perforating with the patient lying quietly in bed, with a practically fasting stomach for thirty-six hours.

Conclusions

1. While peptic ulcer is a chronic lesion which may be treated medically, there are certain types and certain associated complications which would cause one to consider surgical operation as the therapy of choice.

2. When one undertakes to cure a peptic ulcer by medical management. the patient should be informed that he may possibly develop a cancer, he may bleed to death, or he may have a fatal perforation. The latter calamity may occur even while under treatment in a modern hospital.

3. While the X-ray is a very valuable aid in confirming the diagnosis of peptic ulcer, yet a diagnosis which has been made on the strength of a positive ulcer history should not be abandoned on account of negative X-ray findings.

DISCUSSION.

DR. MURAT WILLIS, *Richmond:*—Mr. President and Members of the Medical Society of Virginia:

I was the surgeon who appeared before this Society last year and advocated giving every case of uncomplicated duodenal ulcer an honest trial with medical treatment. Although my presentation was more spectacular than convincing to my friend, Dr. Motley, I am glad he has returned to the subject and given me an opportunity of again dwelling on certain facts with his paper as a basis.

When one is asked to discuss a paper, the conventional thing to do is to utter a few platitudes and let it go at that. My inclination would be to do this were it not for the fact that this is a far-reaching and important subject and one that should be discussed without fear or favor. I appreciate Dr. Motley's desire not to be controversial, but how is one to avoid controversy when opinions are at such variance? One would assume from the essayist's introduction that I had advocated medical treatment in peptic ulcer of the stomach and duodenum regardless of all other considerations. This is not a fact, because in my paper and its publication I gave the following indications for surgery in this disease, and will now quote from my paper: "In chronic ulcer of the stomach surgery is probably safer and preferable to medical treatment; one of several operations may be done, depending upon the location of the ulcer and skill of the operator; such, for example, as excision of the ulcer, with or without gastro-enterostomy or partial gastrectomy. In duodenal ulcers, surgery is indicated in the chronic type that has resisted proper medical treatment; in cases with pyloric obstruction and in all instances of perforation; using such operations as excision of ulcer, pyloroplasty, etc." It is apparent from this that I outlined the type of cases in which I felt surgery should be recommended.

The doctor has reported two perforating cases of duodenal ulcer with a view of emphasizing the dire consequences of medical treatment. I advocated operation on gastric ulcer and on duodenal ulcers resisting medical treatment or those in which pyloric obstruction existed. Dr. Motley's first case was an untreated duodenal ulcer resulting in pyloric obstruction. Even our medical friends would advocate surgery in such a case.

It is the late stage of the untreated disease. It is the type which we used to diagnose before the days of gastro-intestinal X-ray. It is the type for the relief of which gastro-enterostomy was first devised and in which it is so satisfactory if you cannot do a satisfactory pyloroplasty. This late type of complicated duodenal ulcer is about as rare in the average clinic today as the eighty pound ovarian cyst.

His second case was also untreated and undiagnosed. It is quite evident that these two very striking cases do not conflict with my recommendation of medical treatment *in all uncomplicated duodenal ulcers.* Neither of his cases got it. The only way I differ with Dr. Motley in his first conclusion is, instead of stating that peptic ulcer *may be* treated medically, I would substitute *should be* given a conscientious medical trial. In his second conclusion, and I quote him verbatim: "When one undertakes to cure a peptic ulcer by medical management, the patient should be informed that he may possibly develop a cancer, he may bleed to death, or he may have a fatal perforation. The latter calamity may occur even while under treatment in a modern hospital."

I feel it is well that the internist should emphasize to every patient who is going to be treated medically these various dangers, but, if the patient is to choose between medicine and surgery, I believe in all fairness it would be well for the surgeon to be equally frank when he recommends surgical treatment. He has asked the internist to paint the dire consequences of cancer of the duodenum, the rarest of all complications. He has asked that they point out the possibilities of perforation and hemorrhage. What should the internist ask us, as surgeons, to tell the patient when we advise operation in order that the victim of the disease may be properly oriented? (1) That there is a primary operative mortality of from 2% to 10%, depending upon the judgment and surgical ability of the operator. These deaths alone amount to more than those from cancer of the duodenum, hemorrhage and perforation combined; (2) That, of those surviving, it is safe to predict that from 5% to 35% who have a gastro-enterostomy will have a gastro-jejunal ulcer, this second state infinitely worse than the first; (3) That they can also have hemorrhages, as I have seen them following gastro-enterostomy; (4) They can also have a perforation from the primary, recurring, or gastro-jejunal ulcer; (5) They occasionally have a post-operative obstruction; (6) They should also be told that these ulcers are frequently multiple, and it is not uncommon for the surgeon to overlook one or more, and that this is especially true where a gastro-enterostomy is the operation of choice. They should also be told that many of these ulcers are located in dangerous and rather inaccessible portions of the duodenum.

Dr. Motley states that there are many individuals who, for economic reasons, cannot afford a long stay in the hospital which a medical cure sometimes involves, and, for this reason, surgery should be advised. Of all the mistaken economies the worst is submitting a patient to radical surgery on his stomach before giving him a medical trial. It is the most uneconomic I know of for the patient.

I wish I could believe that a posterior gastro-enterostomy so simple of execution in the hands of an experienced skilful surgeon would solve the problem of peptic ulcer. It is unthinkable that a profound constitutional disease with local manifestation, of which we know nothing of its etiology or course, could be solved by so simple a mechanical surgical procedure. I assure you, gentlemen, this simple surgical procedure does not occupy the same relationship to peptic ulcer as does quinine to malaria. To do a routine gastro-enterostomy in this disease, knowing so little of its etiology or life history, reminds me of the old story of the doctor who, when he did not know what else to advise for his patient, suggested that he be thrown in fits as he was hell on fits.

In conclusion, I can but repeat what I said last year that "both surgeon and internist should take a broader view of the problem presented by gastric

and duodenal ulcer; it does not appeal exclusively to one or to the other, but demands the harmonious co-operation of both these practitioners of the healing art if we are best to serve our patient's needs."

DR. W. A. BRUMFIELD, *Blacksburg:*—To illustrate the suddenness with which perforation may take place in some of these cases, without regard to previous history, I should like to tell the story of an incident that occurred in the student body at V. P. I. Some of you may know that I am somewhat of a clearing house for the students there, to excuse them from drill, give them first aid, and direct them to physicians and surgeons if they need medical or surgical attention. They come to me very freely, because they pay an infirmary fee and it costs them nothing, and they often get out of drill. Last winter one of the students went down to the dairy and ate a half pint of cream, went back to his company, and marched to the dining-room. As he went into the dining-hall he grabbed his stomach and uttered a cry as if in excruciating pain. He was taken to the hospital. The consulting surgeon was most accessible, and he gave him a hypodermic. When I arrived the abdomen was rigid and the patient complained of great pain. We considered sending him to the hospital forty miles away, but decided to wait until morning. The next morning he was taken to the hospital, the abdomen was opened, and we found that his stomach had ruptured. The ice-cream was pumped out from among the intestines. After proper surgical treatment, the patient made an uneventful recovery.

DR. WARREN T. VAUGHAN, *Richmond:*—Dr. Willis has asked me in an informal way to present the internist's attitude as to whether the treatment should be medical or surgical. Of course, we are all talking to the same purpose, as there are clear-cut cases in which surgery is indicated and clear-cut cases in which medical treatment is indicated. Dr. Willis's complaint and my complaint and the complaint of many of us is that too many cases are treated surgically when they could be cured medically; not that no ulcer case should ever be operated upon. Now, I am going to disappoint Dr. Willis to just a slight extent. Instead of talking from the medical point of view, I am going to travel into his own field and talk from the surgical point of view. I want to read you just a short quotation from a book just off the press, "The Surgery of Gastro-Duodenal Ulceration," by Charles A. Pannett, Professor of Surgery in the University of London:

"Acute gastric ulcers do not usually require surgical treatment. It is an axiom of the gastro-enterologist that operations should not be undertaken in cases of uncomplicated gastric ulcer until a proper trial of medical measures has proved the lesion to be resistant to this treatment, and to have become chronic.

"There can be no doubt that many true gastric ulcers heal under medical supervision or, indeed, without any treatment at all except that which nature imposes upon the sufferer by forcing him to rest and to restrict his diet. The proof of this lies in the fact that scars of healed ulcers are not uncommonly found during autopsies. Ulcers visible by the X-rays have been observed to become undemonstrable under medical treatment, whilst very often symptoms which appear indubitably to depend upon an organic lesion of the stomach can be banished, never to return. Schindler actually watched the healing of a lesser curvature ulcer through the gastroscope. What proportion of cases are cured in this way is uncertain because, in the absence of visual proof of the existence of an ulcer, only obtainable by operation, statistics must be somewhat unreliable. Clinical experience would lead us to believe that such cures are of frequent occurrence: just as clearly, however, it reveals to us that some ulcers refuse to heal, or apparently epithelialize over, only to break down again at some future period.

"When symptoms of ulcer appear, no thought of surgery should enter the practitioner's mind until proper medical treatment has been instituted and proved to have failed to bring a cure. The conduct of such medical treatment will not be described here: it includes rest in bed, dieting, control of excessive acidity, and the use of such drugs as belladonna, which influence gastric secretion. When one or, better, two attempts at medical cure have proved ineffective, the surgeon may rightly intervene. Surgery in this disease is to be contemplated only upon the failure of medicine.

"It is no more justifiable to recommend every patient with a duodenal ulcer to submit to a surgical operation than it is in the case of gastric ulceration. Putting aside the serious complications of hemorrhage and perforation, a counsel of delay is always demanded, unless a fair and proper trial of medical measures has been carried out."

Dr. Pannett mentions especially perforation, profuse hemorrhage, obstruction, and extensive scar tissue formation as usually indicating surgery.

DR. MOTLEY, *closing the discussion:*—I want to thank Dr. Willis for his very frank discussion of my paper. Of course, I was thoroughly familiar with Dr. Willis's viewpoint on this subject, and that is why I asked him to discuss this paper. I had attacked his position, in a mild way, and wanted to give him a chance to defend himself.

There are two points I want to emphasize. One is the question of mortality. There has been a good deal said about the surgical mortality in operating on ulcer cases. In the more conservative methods of operating it is less than two per cent. Now, my experience has taught me that there is a very distressing mortality sometimes in cases under medical treatment. The economic question, too, I think, is one that deserves consideration. Out in southwestern Virginia, where my work is done, the cattle market has been off for the last five years, and the farmers have hardly gotten enough for their wheat and corn to pay them for raising the crops. So they are hard up. A medical man, in discussing this subject some time ago, stated that every six months he would have these cases examined with the X-ray, and he reported, with a good deal of enthusiasm, that each six months he noticed a little change, that they seemed to be improving a little bit. Now, I think you will agree with me that if these patients are to be treated medically they ought to be in a hospital. You can not let them go home and try to carry out the treatment, for they will not do it. Now, we have a great deal of difficulty in inducing our patients to stay in the hospital even four or five days, and I know we could not get them to stay long enough for one of these semi-annual examinations. Now, after operation, the man can go back to his work after six weeks and be a wage-earner again. We know there is a good deal of dissatisfaction among surgeons at the present time about our treatment of this condition. That is a hopeful sign, for without dissatisfaction there can be no progress, and this dissatisfaction is leading to a good deal of research work, which will result in better treatment. I think the fundamental fact in the treatment is to find out why people have ulcer. When we find that out it may be that the

internist will develop some better treatment than we have at present, and when we do I shall be very happy to welcome the dawn of a new day.

SKULL FRACTURES.*

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The subject of head injuries is of such importance to the surgeon and even to the general practitioner who often has to deal with the later complications of such injuries as to warrant a rather frequent survey of the literature. The field embraced by this subject is so large, however, that I have felt obliged to confine myself to a rapid consideration of the method of causation, importance of type of fracture and clinical signs in prognosis and treatment, pathology and complication of skull fractures together with a brief discussion on the value of spinal puncture in treatment.

The increasing hazards of our modern life are producing an even greater number of skull fractures than formerly.

That fractures of the skull are not vastly more frequent is due to various factors; among them are the rounded shape of the calvaria, causing blows to glance off; the division of the separate bones into inner and outer tables with comparatively spongy diploe intervening; the density and mobility of the scalp; the sutures interrupting the transmission of violence; the curved thickenings which, like buttresses, strengthen the skull externally, and extend on each side through the supra-orbital ridge and the upper border of the temporal fossa to the mastoid process and thence to the occipital tuberosity; and the mobility of the head on the spine. In very young persons the dome of the skull is made up of three distinct arches composed of the occipital, the frontal, and the parietal bones. In childhood the center of each of these bones is, on account of early ossification, thicker than the rest, while the edges are connected by membrane and are comparatively movable. These mechanical conditions, together with elasticity of the individual bones in young persons, make fractures of the skull in them rare.

Mode of Injury.—Fractures of the vault are usually due to direct force, and fractures of the base to extension of fractures of the vault or indirect violence. Fractures of the base by direct violence may arise from the penetrations of the nasal roof, the orbital roof or the pharyngeal roof by foreign body. The amount of injury depends upon the type of force causing the fracture. A bending force seldom causes distant injury and is applied by the forcible impact of a body of small area. A bursting force usually causes wide spread injury and is applied by blows on the head from large objects or falls on the head.

Carter, in a report of 233 cases, states that about one-half of these were caused by automobile accidents, and of the 80 cases in this series that died, 32 per cent were due to the automobile. This emphasizes, first, the importance of the automobile as a factor in producing skull fractures, and, second, the seriousness of the injuries thus sustained. He also points out a fatal form of injury in those cases which receive a very forcible blow on the point of the jaw with a fracture of the jaw and a fracture from indirect violence to the base of the skull. Of these, he had six cases, all of which died in a few hours.

Type of Fracture.—Here one finds a marked variation in the mortality, and there is much of prognostic value in the type of fracture. In a series of 33 cases admitted at the U. S. Marine Hospital No. 82, the types of fractures were as follows:

Simple or depressed fracture of the vault—13 with one death.
Simple or depressed fracture of the base—3 with one death.
Simple or depressed fracture of vault and base—5 with one death.
Compound fracture of the vault—6 with two deaths.
Compound fracture of the base—5 with four deaths.
Compound comminuted depressed fracture—1 with one death.

The simple fractures of the vault offer the best prognosis, whereas, the most serious are those involving the base. DaCosta states that in over 60 per cent of fractures of the vault the base is involved, and in fractures of the base over 80 per cent extend into the vault. Fractures into the middle fossae are the most frequent, while those in the posterior fossae are the most fatal. The compound comminuted depressed fractures with extensive cortical lacerations and associated basilar injuries are of the most grave prognosis.

Sex and Race.—In this series the patients were all males, with 27 whites and 6 colored. Different writers have reported large series of cases including both sexes, and the mortality seems to be about equal in each. There is little of significance in the sex or race as

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such; since the severity of the injury is the most potent factor.

State of Consciousness.—Much stress is laid on the state of consciousness as of value in prognosis and as a guide in treatment. In our series 17 were unconscious on admission, with 9 deaths. Phelps reports 342 cases of fracture of the skull with unconsciousness and 318 deaths; Ransohoff 98 cases in deep coma with 70 per cent mortality. A steadily increasing state of consciousness is a good omen, even if some of the other findings are not so encouraging, whereas, a deepening state of unconsciousness causes considerable alarm and demands urgent relief of pressure. The classical picture of an immediate loss of consciousness, followed by a clear interval, which is in turn followed by a second loss of consciousness, calls for an immediate operation, which nearly always discloses an extra-dural hemorrhage.

The Pulse.—The pulse rate unfortunately is not an accurate or an early means of determining the severity of the intra-cranial lesion: ordinarily, the greater the intra-cranial pressure, and, therefore, the less blood supply to the medulla, the slower the pulse rate, but the resistance of the medulla to slight change in its circulation varies so much in different individuals that it is possible to have a high degree of intra-cranial pressure and yet a pulse rate running between 70 and 80 for a period of hours. A steadily diminishing pulse rate means a steadily increasing intra-cranial pressure, and indicates that the pressure must be relieved. Carter believes that, in addition to a slow pulse, if there is an irregularity in rate (thus, if one holds the pulse a full minute or two, he will count fifty for one-quarter and perhaps ninety the next), steps should be taken to relieve the pressure or the case will soon pass over into that stage where therapy will be of no avail.

Respiration.—The respiration, like the pulse rate, is affected by shock, and may exceed 40 for an hour or more after the injury. If, when one first sees a case, it presents Cheyne-Stokes respiration, the prognosis is usually bad, or if this type of respiration is allowed to appear in the course of the illness, the hope of recovery is slight. The following are the most important points in regard to respiration:

1. A steadily slowing respiration means increasing pressure.

2. Frank Cheyne-Stokes respiration, with a rapid weak pulse and coma, contra-indicate operation.

3. Slight early irregularity in depth of respiration is most important as a positive sign of impending decompensation.

Temperature.—On admission, the temperature means little unless it is extremely high or unduly low. In the former one would fear the stage of cerebral decompensation has been reached, and, if the latter, the danger from shock is of paramount importance. In favorable cases the temperature rises promptly after shock is recovered from, but does not usually go higher than 102°; it then falls by recessions of a degree or so a day. Operation is not advisable on a patient with 102° and steadily mounting. The onset of meningitis or brain abscess is usually indicated by a sudden rise of several degrees. Wilensky calls attention to the prevalence of fever in skull fractures, and attempts to explain it in one of three ways:

1. The upset of the heat center.

2. Meningitis.

3. The escape of cerebro-spinal fluid through tears in the pia which, in the presence of a bacteriema, gives a temporary mild meningitis.

Bleeding.—In the series reported by Carter, 59 bled from the nose with 44 per cent mortality. Eighty-four bled from the ear with 50 per cent mortality, and of 80 cases that did not bleed, 12½ per cent died. Therefore, bleeding from the ears, nose or mouth usually means more extensive injury to the base of the skull and a resulting high mortality. Negligence in caring for a bleeding ear or nose is sure to lead to a certain number of cases of meningitis. Cleanliness and avoidance of introducing fluids into the ear or nose are the essentials. Carter recommends that the external ear or nose be cleaned with gauze moistened in hydrogen peroxide and to apply a large sterile dressing to the ear. This is changed as often as necessary. He reports only two cases of meningitis in a series of 233. DaCosta advises the ear and nasopharynx to be irrigated frequently with normal salt solution or boric acid and insufflated with iodoform. We have been using mercurochrome, 2 to 5 per cent, and placing sterile cotton in the ear.

Blood Pressure.—The blood pressure gradually rises until the stage of decompensation be-

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gins. Sharpe states "the blood pressure rarely exceeds 160 unless the patient shows early signs of medullary compression; also the high intra-cranial pressure necessary to raise the general blood pressure to any appreciable extent must reach a very dangerous state of compression in acute cases before its effect can be observed in an increased blood pressure." A number of years ago venesection was considered advisable to lower this increase of the general blood pressure associated with medullary compression. However, it is no longer employed, because it is now known that this increase in the general blood pressure is the attempt of the natural vasomotor mechanism to force blood into the intra-cranial chambers, and thus into the medulla by overcoming the increased intra-cranial pressure. To bleed a patient, therefore, even in mild cases, is an exceedingly dangerous procedure of no real value, and is always contra-indicated.

Pupils.—Some value can be placed on the pupillary changes as an indication of the amount of intra-cranial damage. In our series there were three cases with dilated fixed pupils, with three deaths; two with pupils dilated on side of injury, but reacted to light and accommodation, which made good recovery; two with small contracted pupils, with two deaths; and twenty-three cases with no pupillary changes, with two deaths. There was no record of pupillary change on three cases which died shortly after admission. Fixed dilated pupils indicate an extreme amount of intra-cranial damage with high mortality. Carter reports 100 per cent mortality. Nichols advises against operations when they are present. Ransohoff reports forty-two cases with forty-one deaths. The dilated pupil is most often on the side of the injury, for the damage is severe, so much so, as to cause large mortality in different series of cases reported; when, however, the pupil on the opposite side is dilated it makes one feel that the contracoup damage is more severe than that on the side of the injury, and that the sum total of the injury is such that an extremely poor prognosis is offered. Sharpe explains the pin-point pupil as due to cortical irritation from supra-cortical hemorrhage, producing the irritative stage of pupillary contraction, and when the compression of the cerebral cortex increases high enough, it gives way to the paralytic stage of dilated pupils. When a pupil which was equal to its mate on admission, later becomes dilated, it means that the intra-cranial damage is increasing, and one becomes suspicious of an extra- or intra-dural hemorrhage, although some authors emphasize the point that an extra-dural hemorrhage is often accompanied by irritative phenomena rather than by paralysis.

Examination of Fundus.—Sharpe states that the presence or not of choked discs as the signs of increased intra-cranial pressure has possibly retarded the recognition of the earlier signs more than any other factor. In the acute stages the fundi rarely give any information other than what one can glean from other sources. Some authors report constant findings of blurring of disc edges with fullness of vessels. Jackson does not feel that the fundus shows much change early and does not rely on them.

Convulsions.—The comparative infrequency of convulsions associated with acute brain injuries is very singular. In a series of 487 cases, Sharpe reports twenty-seven cases with convulsions or localized twitchings. Carter reports nine in a series of 233 cases. In these cases, Carter believes it a good policy to operate if a focal convulsion is repeated two or three times over an interval of an hour, as much for the possibility of correcting the damage which may later lead to epilepsy as for immediate results. On this point, Sharpe believes why a small number of these patients develop epilepsy later, is, not so much a question of possible cortical adhesions, depressions of the vault or foreign body spicules, but rather in addition to these factors, a chronic increase of the intra-cranial pressure and especially in patients of lessened nervous stability. He states that, in examining a large number of post-traumatic epileptics, they all had chronic wet, swollen edematous brains, causing a definite increase in intra-cranial pressure, and many of these patients did not have cortical adhesions to be disclosed either at operation or autopsy. In this connection, he also calls attention that frequent convulsions will eventually produce a wet edematous condition of the brain, so that any increase of the intra-cranial pressure in many of the chronic patients is a secondary one, resulting from the convulsions rather than the primary cause. A method of determining whether the increased intra-cranial pressure in these cases is primary or secondary to the convulsions is to ascertain the spinal pressure, then, by vigorous use of triple bromides or luminal, to

prevent the seizures for a period of four to six weeks. If the spinal pressure is the same as before, then the increased intra-cranial pressure is primary, whereas, if the spinal pressure is almost normal, then, it may be concluded that the convulsions are causing the chronic cerebral edema. This test is important in regard to advisability of any operative procedure.

Spinal Puncture.—The relief of intracranial pressure can be obtained early and safely by repeated spinal punctures. The relief so obtained prevents medullary compression, and the symptoms usually looked upon as indications for operation do not appear. The doing of a lumbar puncture, therefore, is of the greatest importance, and it should be performed on each patient as early as possible after the signs of initial shock have disappeared.

Jackson believes that sub-temporal decompression (supra-tentorial) does not adequately relieve pressure on the medulla (sub-tentorial) but lumbar drainage does relieve pressure on the medulla and suffice to prevent death. He bases his argument on the anatomy of the cerebro-spinal water bed; thus, the cerebro-spinal fluid is probably secreted in the ventricles by the choroid plexus. The fluid finds its way from the lateral ventricles through the foramen of Monro to the third ventricle, thence along the aqueduct of Sylvius to the fourth ventricle. In the roof of the fourth ventricle posteriorly is the foramen of Magendie, and in each lateral recess the foramen of Luschka, through which the fluid escapes to the large cisterns beneath the arachnoid. There are cisterns of the sylvian fissure, optic chiasm, interpeduncular space, pons cerebelli, medullary region and great vein of Galen. The fluid rises through the incisura tentorii, to be distributed over the cortex of the cerebrum. This is constantly being absorbed, mostly by the arachnoid villi, into the dural sinuses where there is no obstruction to its circulation. The cerebral and spinal sub-arachnoid systems are freely connected with each other, allowing artificial drainage of the cerebral sub-arachnoid water bed by the spinal route. Therefore, a slight swelling or hemorrhage of the cerebrum or mid-brain blocks the cerebral sub-arachnoid spaces, and the fluid cannot be absorbed along its natural channels. The fluid no longer rises above the tentorium, but collects in the basal cisterns, causing direct pressure on the medulla and forcing the mid-brain up, occluding further the narrow sub-arachnoid spaces in the incisura tentorii. The enlargement of the lateral ventricles above the tentorium forces the cortex of the brain still more against the dura, and, unless the excess of the fluid is withdrawn from below the tentorium, a dry and flattened cortex is found at operation or autopsy. In addition to repeated spinal punctures, Grant advises the use of hypertonic solutions and ventricular tap, if necessary. In our series the effect of glucose on the spinal pressure was tried in two cases. The technic was as follows: After taking the spinal reading, 10 grams of glucose in 20 c.c. of water was given intravenously. The reading was taken every fifteen minutes for one hour, and again taken the next day. There was no drop observed in the spinal pressure at any reading. At the present time very few authors advise operation in the treatment of skull fractures unless all other measures for the relief of pressure have failed, except in cases of depressed fractures or extra-dural hemorrhage. From the standpoint of spinal punctures, skull fracture cases may be grouped as follows:

1. Cases with definite evidence of skull fracture but a normal pressure and no alarming symptoms. One puncture suffices. If the pressure is normal, no fluid is withdrawn.

2. Cases with evidence of increased intracranial tension of severe or moderate degree and on whom puncture shows a high pressure (20-30 m.m.). Following one or more punctures, the sign of the pressure diminishes and succeeding punctures show a falling pressure. The fluid here is apt to be quite bloody. Punctures are done at intervals until the pressure is normal or the signs are no longer alarming. It is in this class that the puncture finds its greatest therapeutic value and obviates many decompressive operations.

3. Cases with marked evidence of intracranial pressure and high tension on the initial puncture; subsequent punctures show either no drop in pressure or rising pressure. Here the puncture is of little value therapeutically, but is of much value as an indication for some other means of relief of pressure. This is the class to treat by decompression.

4. Cases with evidence of high intra-cranial pressure and high initial tension, but in sub-

sequent taps reveal a low pressure and examination shows no diminution in the severity of symptom. Here the symptoms seem to be due to injury of the brain itself rather than to pressure upon it. Decompression seems of no avail, for, when the dura is exposed, no undue tension is found, and the patient succumbs.

5. Cases with marked evidence of pressure, with the spinal fluid clear, of small amount and under high pressure. In these, suspect extra-dural hemorrhage, and if subsequent examination shows localizing signs, decompression is indicated.

Carter believes that spinal puncture is of great value following operations where signs of pressure still exist, and is a factor in aiding them to survive the operation. It also seems that if one assumes that some of the late effects of skull fractures, such as headache, dizziness and mental changes, are due to continued increased intracranial pressure, that it would be rational to continue the puncture during the patient's convalescence until the pressure is found normal.

Pathology.—LeCount, in an analysis of 547 cases of skull fracture that came to autopsy at the Cook County Hospital between 1911 and 1918, summarized the chief pathological lesions as follows: 20 per cent are extra-dural hemorrhages resulting from rupture of the middle meningeal artery. In 95 per cent of all fractures there were sub-dural injuries. These consisted of sub-arachnoid or subpial hemorrhages, with a maximum of 100 grams of blood, the average being 40 grams, and only 1 to 10 grams in 40 per cent of the cases. The most frequent change was traumatic edema. Here the convolutions were found flattened, suggesting pressure of the brain against the dura and skull, and the disappearance of the sub-arachnoid water bed. The cerebral vessels were empty and flattened, suggesting an anemia of the brain. The peripheral ends of the sulci were closed, obliterating the normal cistera of cerebro-spinal fluid. The fluid in the lepto-meninges was lessened, and the visceral layer of the arachnoid almost dry.

Process of Healing.—The process of healing does not take place as in the long bones where there is abundant callous formation. Union often occurs by fibrous membrane; even narrow fissures may fail to become reunited by bone. As a rule, however, a slow process of bone production and absorption goes on, hand in hand, and irregular edges are rounded off as the gaps are more or less filled in. It may be long delayed or may completely fail, due, according to Bergmann, to the destruction or loss of the osteoplastic layer of both inner and outer periosteum as well as to the absence of movement which ordinarily stimulates callous formation. According to Bergmann, defects cannot be expected to close if they exceed a diameter of six to eight centimeters, and it would indeed seem that it is rare even for smaller openings to fill in. There is a great difference of opinion as to the injurious effect of these bone defects, some holding the view that, when extensive, they lead in the course of time to serious mental symptoms. Cushing does not believe they are injurious unless accompanied by an underlying lesion of the dura. When the dura is wounded and the scar formation leads to adhesions between overlying scalp and brain, the chronic fibrous changes which result may lead in time to extensive cortical alterations and mental deterioration.

Complications.—Of the early complications following skull fracture, in our series there were two cases of meningitis, one of facial paralysis, and one of acute encephalitis. Of the late complications, there were five who complained of headache and dizziness, two impaired hearing, one of which also complained of numbness in right side of body and impaired vision right eye, one case of aphasia, two cases of traumatic neurosis, one of epilepsy, one of osteomyelitis, and two cases of post-traumatic insanity. The late complications are rather high in this series, due to the fact that nine were admitted as old fractures.

Neurosis Following Traumatism. — Post-traumatic neurosis may be designated as being a post-traumatic neurasthenia, psychasthenia, or, in general terms, a nervous breakdown. It is solely a functional impairment and in no way associated with an organic lesion; however, it is very important to differentiate the two. Sharpe believes that a very large percentage of these patients were unstable emotionally for periods of months or years before the accident, and that the injury itself merely precipitated and externalized the underlying neurotic condition. The recent psycho-analytical method of examination frequently reveals the predisposing cause for emotional tension, domestic unhappiness, business worries, a craving for sympathy, a future law suit for dam-

age as a result of the injury. The more common signs associated with conditions of post-traumatic neurosis are coarse irregular tremors and ataxia of the hands, a fine tremor of the eyelids upon closing the eyes, and very active reflexes. No Babinski reflex is found in a true case. They show an inability to concentrate, an intolerance to alcohol and the rays of the sun. Treatment consists in correcting the environment and giving the patient a mental rest.

Epilepsy.—Head injuries may produce focal epilepsy, but sometimes set up the common form of the disease. In the Franco-Prussian war, as a result of 8,985 non-fatal head injuries, forty-six cases of epilepsy developed, only about one-half of one per cent.

It is well to remember the origin of epilepsy subsequent to a traumatism may be coincident; the condition may be essential epilepsy and the traumatism may have had nothing to do with it. Epilepsy ensuing upon traumatism may not begin until months or even several years after the injury. If an identified traumatism exists, DaCosta believes the surgeon should operate even after years, and, if the traumatism has not left definite evidence, the surgeon is justified in making an exploration at any time up to the termination of the third year after the accident. The best prognosis of any form of epilepsy is given by Jacksonian epilepsy of traumatic origin, and the chances of cure are much better when following an injury in the motor regions rather than the sensory regions. When it follows an injury in the frontal regions, operation affords very little hope of cure.

According to Sharpe, post-traumatic epilepsy is usually the result of a condition which could have been relieved by operation at the time of the injury. He also states that after the convulsions occur, it is frequently too late to obtain a good result, even if the depressed area of bone or foreign body irritating the cerebral cortex is removed, and especially after the so-called epileptic habit resulting from chronic cortical irritation has been established; a cranial operation at this late date will in many cases be followed by merely a temporary cessation of the spells, and within a period of one to three years the convulsive seizures are as numerous, if not more frequent. than before.

Traumatic Insanity.—DaCosta states that traumatism is the cause of about 3 per cent of cases of insanity. Stopler collected 981 injuries to the head, and, of these, 138 had a very serious concussion, yet only twelve cases of insanity resulted. In consideration of traumatic insanity, we must make a thorough investigation into the antecedent conditions, such as hereditary pre-disposition, previous attacks of mental disorder, an alcoholic history, and the presence of syphilis. The trauma may simply be a determining factor in an attack of mental disease, an outbreak of delirium tremor, or the beginning of paresis. The severity of the trauma seems to have very little relation to the ultimate seriousness of the result. As to treatment, in a case in which the intermediate period between the injury and the development of the insanity has shown the change from the normal mode of thinking and way of acting previously alluded to, and in which the site of trauma is indicated by a scar, a depression of bone, local tenderness, fixed headache, or some localizing symptom, DaCosta believes operation should posivitly be performed.

In summarizing the most important points, one may come to the following conclusions:

1. The amount of injury depends upon the type of force causing the fracture.

2. There is a marked variation in mortality and much of prognostic value in the type of fracture.

3. The state of consciousness, pulse, respiration, and temperature are the more important signs to estimate the degree of intra-cranial tension, while the blood pressure and examination of fundi are not of much value in early stages.

4. Some value can be placed on the pupillary changes as an indication to the amount of intra-cranial damage.

5. Spinal puncture is the most desirable method to relieve intra-cranial tension, and is not only of therapeutic value, but a diagnostic aid.

6. The cause of epilepsy or late complications may be due to chronic increased intra-cranial tension rather than a question of cortical adhesions or depressed area of bone.

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HEMANGIOMA OF THE LIVER.

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Of all the internal organs the liver is the one most frequently attacked by hemangioma. While pathologists are familiar with its occurrence and its characteristics, and numerous examples of it have been found post-mortem, clinicians have rarely had an opportunity to observe this condition. This is because hemangioma does not often cause symptoms, and when symptoms do arise they are not immediately referable to the hemangioma, but are the expression of dysfunction in such neighboring organs as may be encroached upon by the enlarging growth.

Furthermore, hemangiomata are very slow-growing tumors, and may take years to develop to any considerable size. Since their walls are usually quite thin, their detection by palpation is often difficult and may be entirely impossible.

The origin of these tumors and whether they are true new growths or merely dilatations of already existing blood vessels have never been definitely determined. A concise review of our knowledge of hemangioma is contained in the following quotation from Ewing:[1] "The common cavernoma of the liver is of much theoretical interest, but rarely produces symptoms. They are single or multiple, as small as a pea or as large as a child's head (Ribbert), and usually lie just beneath or projecting from the surface. They are often associated with angioma of other organs. Their frequency increases with the age of the subjects, but congenital cases rarely occur. Veeder and Austin describe a remarkably extensive multiple congenital hemangioma of the liver. Virchow believed that they might spontaneously disappear, leaving scars. The structure shows central sinuses separated by thin fibrous or cellular septa which may contain islands of liver cells. On the edges are smaller vessels communicating with the sinuses. The tumor is sharply marked off from the parenchyma. Ribbert finds that interstitial injections of the tumor or of the surrounding parenchyma do not pass from one tissue to the other, the tumor vessels showing a marked independence of the normal vessels of the organ. Yet the tumor may be filled by injections through the portal or hepatic veins or hepatic artery (Virchow).

"The origin and nature of the cavernoma of the liver has long been a subject of discussion, the later phases of which have been maintained by Ribbert and by Schmieden. On the whole, the argument seems to favor the contention of Ribbert, that these growths are partial neoplasms originating from embryogenic disturbances, through which a displaced segment of the organ comes to possess a limited power of aberrant growth. As already stated, Virchow traced their inception in areas of proliferating vascular connective tissue. The progressive dilatation of vessels naturally results from absence of muscular and elastic tissue in the walls."

Peck[2] in 1921 recorded the successful extirpation of the left lobe of the liver for an hemangioma weighing three pounds fourteen ounces (1759 grams). This is the largest tumor of this character successfully removed in this country, though not the largest ever reported. Pfannenstiel[3] removed one even larger, the collapsed growth weighing five pounds after a large quantity of blood had escaped from it.

In reporting his experience Peck reviewed thoroughly all of the operative cases up to that time and found that his was the twenty-first in which operation had been attempted. Excision of the growth was done in seventeen of the twenty-one with fifteen recoveries and two deaths.

A careful search of the literature subsequent to the date of Peck's report has revealed only two more cases in which the tumor was excised, one recorded by Nossen[4], of Germany in 1924, and the other by Wakeley[5], of London in 1925. The tumor occupied the left lobe of the liver in both of these cases, and in both it was successfully removed.

The case which is presented in this report is apparently the twentieth instance in which resection of the growth has been accomplished. Of these, eighteen have recovered and two have died—a mortality of 10 per cent.

There are several other recorded instances in which exploratory laparotomy revealed hemangioma of the liver, but excision of the tumor was not done. In the operative cases females have been affected nearly three times

as often as males. The tumor has been found in the left lobe twice as frequently as in the right. The spigelian lobe has also been found involved, and multiple tumors have been reported.

The operative hemorrhage in the recorded cases has been variable, depending chiefly upon the size of the growth and its anatomic location and attachments. Dr. Peck noted that where the constant, dragging weight of the tumor has created a tendency to pedunculation, excision has been facilitated. Aspirating or puncturing the tumor wall is extremely dangerous and has caused fatal hemorrhage.[6]

Peck states that the chief agents used by the various operators in controlling hemorrhage have been the elastic ligature, chain ligatures through the pedicle, cautery excision, and packing.

The history of the present case is as follows:

J. P. Colored female; married; age, 39; occupation, domestic. Admitted to St. Philip Hospital, August 31, 1926. Operation September 29, 1926. Discharged November 21, 1926.

Chief Complaint: Growing tumor in upper abdomen, accompanied by loss of strength.

Family and Past Personal History: Unimportant. No serious illnesses. Menstruation always normal. She has had two children, now aged 14 and 12 years, with a miscarriage occurring between these two births. She was normally healthy up to the onset of her present complaint.

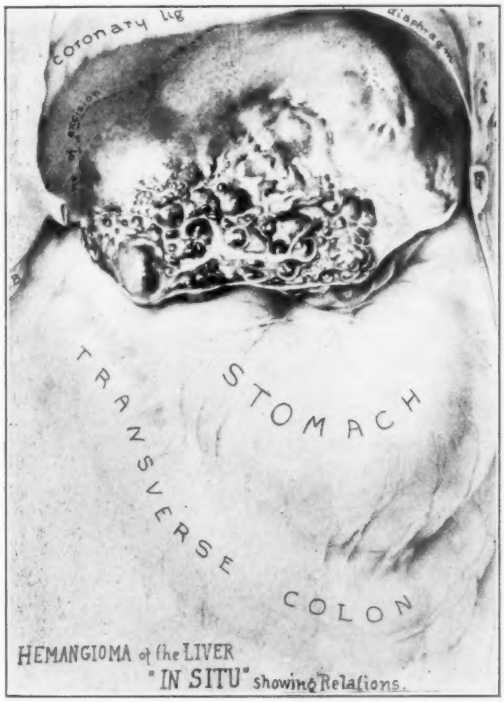
Present Illness began between five and six years ago when she first noticed a lump in her upper abdomen. This was small and rather movable at first but progressively enlarged and became more fixed. Increase in the size of the growth was accompanied by shortness of breath on exertion and by progressive weakness. The growth has never caused pain, though the sensation of weight is always present. There have never been any symptoms of an inflammatory nature associated with the tumor, nor has she had nausea, vomiting, nor marked constipation.

Physical Examination: Temperature 98.6°; pulse 100; respiration 22.

General Appearance: Well developed and well nourished, but anemic.

Head: Anemia of skin and mucous membranes. Eyes, ears and nose negative. Teeth good. Tonsils negative. Tongue coated.

Chest: (a) *Lungs*—Diminution of breath sounds in the left lower lobe when lying down, otherwise negative.



(b) *Heart*—Normal except for some apparent displacement upward and to the left.

Abdomen: Shows a firm tumor in the mid-epigastric region, extending thence somewhat to the right and considerably toward the left. It is rather spherical in shape, and extends downward nearly to the umbilicus. A notch can be felt in its lower border. The tumor descends with inspiration. It is painless, very firm and rather fixed, though there is some lateral motion. No tenderness can be elicited anywhere in the abdomen. The stomach seems to be displaced to the left and posterior to the mass. The right lobe of the liver cannot be palpated. Both flanks are clear and the lower abdomen is soft and flat.

Vaginal Examination is negative.

Extremities: Negative.

Reflexes: Normal.

Laboratory Examinations: (a) *Urine* negative except for a faint trace of albumen.

(b) *Blood* shows hemoglobin 60 per cent; red cells, 3,400,000 per c.m m.; leucocytes, 11,-

000 per c.m.m. with 64 per cent polynuclears, 32 per cent lymphocytes, 3 per cent large mononuclears, and 1 per cent eosinophiles.

(c) Her *Wassermann* reaction was negative.

On these findings a tentative diagnosis of some form of splenic enlargement in an unusual situation was made, and she was referred to the X-ray department for observation and treatment. Dr. J. L. Tabb presented the following report:

"The mass does not feel like an enlarged spleen, inasmuch as it does not extend to the mid-lumbar region. The right border of the mass, however, is sharp and apparently notched and the feel of it closely resembles an enlarged spleen. It is hardly probable, however, that an enlarged spleen would fail to fill the abdomen in the mid-axillary line just below the diaphragm. For this reason a fluoroscopic examination of the chest was made.

"Fluoroscopic of Chest: Lung fields clear. Heart and aortic shadow normal. Left side of diaphragm not materially elevated and there is no material impairment in its mobility. An enlarged spleen practically always causes an impairment of movement of the left side of the diaphragm. A faint rounded shadow is seen apparently extending from the right to the left, and its left border does not reach to the splenic area.

An enlarged spleen would probably cause a displacement of the stomach backward and to the right. A barium meal administered shows the stomach displaced downward and to the left. The lesser curvature is lengthened apparently by pressure on the lesser curvature by a smooth rounded mass originating near the median line or on the right side and extending towards the left. There are a few filling defects in the cardiac portion of the stomach, one of which may be due to pressure of the stomach against the hilum of a normal spleen.

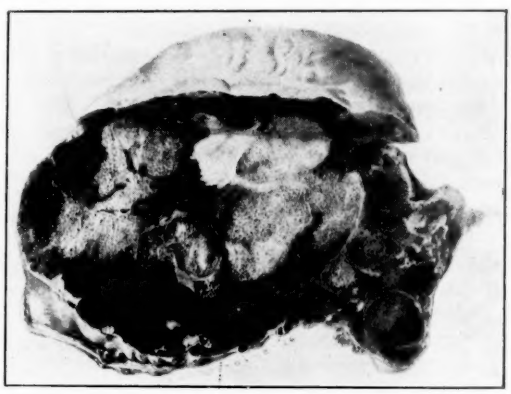
"Twenty-Four Hour Examination: Entire colon is well filled. Transverse colon is pressed slightly downward and its left side is displaced slightly to the left curving around the border of the mass. The splenic flexure is in approximately normal position. The descending colon follows a normal course. The hepatic flexure is rather low. No defect is seen in the colon.

"Conclusion: The mass in patient's abdomen is not an enlarged spleen, therefore treatment to spleen is not indicated. In view of the slight roughening of the cardiac end of the stomach, which is probably produced by solid food, it would be advisable to explore this area when the abdomen is opened."

The spleen being thus disposed of, my next guess was a pancreatic cyst with unusually firm walls. The liver was thought to be eliminated by the location of the tumor, the absence of any enlargement in the right lobe, the absence of jaundice, and of bile in the urine, and the very slight interference with the gastro-intestinal organs caused by a mass of such size. Moreover, the site of the tumor corresponded with the most frequent location of pancreatic cysts, which usually reach the surface through the gastro-hepatic omentum.

An exploratory operation was contemplated, but it was thought best to increase the patient's strength and enrich her blood as much as possible beforehand. She was kept in bed on a liberal diet and tonics were given for some time. In spite of these efforts her hemoglobin continued to fall, reaching 45 per cent on September 25th. Further delay seeming hopeless, operation was done on September 29th.

A long left rectus incision was made and the tumor was exposed. It was immediately seen to be continuous with the liver, occupying its left lobe and lying to the left of the gastro-hepatic omentum, being suspended to the under surface of the diaphragm by the coronary ligament which was attached at its upper, posterior border. There were a few light adhesions to the lesser curvature of the stomach. The stomach itself, though dilated and dragged



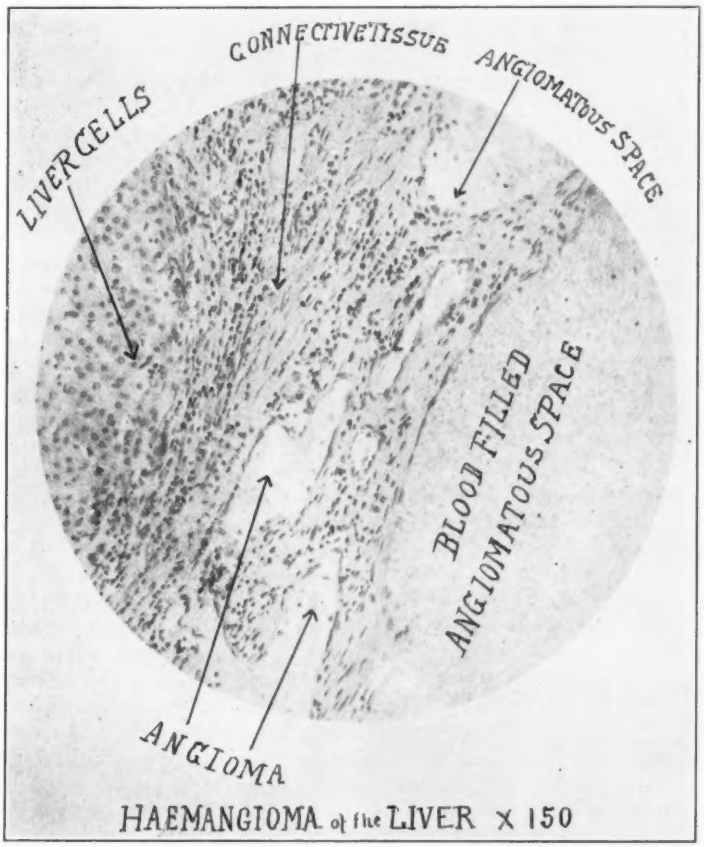
downwards, was otherwise normal; as were the spleen, transverse colon, duodenum, right lobe of the liver, gall-bladder and bile ducts. The pelvis was not explored and the appendix

was not removed. After freeing the adhesions and dividing the coronary ligament between clamps, it was possible to place two rubber-covered, curved intestinal clamps on normal liver tissue proximal to the tumor to control hemorrhage, passing one from behind forward and the other from before backward until they met. The tumor was then cut away, and the cut surface of the liver was sutured, using chromic catgut in a Reverdin needle, and employing the interlocking stitch of Kousnetzoff and Pensky.[7] The coronary attachment was then ligated. Although hemorrhage had been surprisingly slight, a cigarette drain was placed for safety, and was led out of the upper angle of the wound which was closed in layers.

There was considerable shock following the operation, but she rallied from this nicely and her further convalescence was without incident.

The drain was removed on the fifth post-operative day; she was soon eating a liberal diet, and was propped up in bed in the fourth week. At the end of a month she was walking about the ward and her general condition was excellent. Her hemoglobin, however, had only reached 45 per cent again when she left the hospital on November 21st, seven and a half weeks after the operation.

Dr. Charles Phillips made the following report on the tumor:



"Gross Description: The specimen is a semi-solid tumor of the liver weighing 1,015 grammes (2¼ lbs.), and measures 19x16x5 c.m. (7½ ins. x 6½ ins. x 2 ins.); it is discoid in shape and of a mottled bluish-red color. On what resembles the peritoneal surface there is a fairly well circumscribed area 13x16 c.m. (5 ins. x 5½ ins.) of more or less rounded bluish elevations of angiomatous spaces filled with fluid blood. The whole specimen appears

to have been dissected out of the liver and the cut edge shows mottled yellow tissue resembling fatty degeneration. The blood-filled spaces vary in size and shape and the largest is about 4 c.m. in diameter. On the peritoneal surface there are many fibrous trabeculae running in various directions.

"MICROSCOPIC DESCRIPTION: The blood spaces vary greatly in size and are lined with a flattened endothelium on a thin fibrous stroma. They are separated by poorly developed and in places degenerated liver tissue. Practically no normal liver parenchyma is found, due to compression and degeneration.

"PATHOLOGICAL DIAGNOSIS: Large cavernous hemangioma of the liver."

On January 5, 1927, I examined the patient in my office. She had gained in weight and strength and there was no apparent anemia.

Abdominal examination was negative. The operative scar was excellent. There were no abdominal masses nor tenderness. She had no subjective symptoms and appeared to be completely cured.

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PUERPERAL ECLAMPSIA.

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Formerly Professor of Practice of Medicine, in Southern Medical College, Member Medical Society of Virginia, etc.

If there is anything in this world that is calculated to strike terror to the hearts of all who are present it is a puerperal convulsion, either before or after delivery. Everybody is scared to death, some weeping and wailing, others looking like petrified ghosts, none with sense enough left to do a sane thing, and if the doctor can keep his equilibrium and appear calm and unruffled he is exceedingly lucky. I heard a doctor say once in a medical convention that he was always scared when a typhoid patient had intestinal hemorrhage, and that the only thing that scared him any more than that was puerperal eclampsia. If there ever was a time when the doctor ought to have complete control of himself and of all his powers it is a time like this. Having had many cases of this kind it may not be amiss to detail a few of them. I am glad to be able to say—and I say this not in a spirit of egotism, but with humble, grateful acknowledgment to Almighty God—that I have never seen a fatal case, although I have had all sorts and sizes, both before and after delivery. I think we have a better chance after delivery than before, for obvious reasons.

CASE 1. Here is a case of a young woman with her first baby. She had one big convulsion just before the baby was born. Fortunately, the conditions were favorable and I immediately took the child with the forceps, then bled her from the arm and injected into the bowel about thirty grains each of sodium bromide and chloral hydrate. She had no more convulsions, but slept about twenty hours without any sign of a return of consciousness. Some of the women said I "gave her too much chloroform" and they were afraid "she would never wake up." The fact is she had not had any chloroform at all. It was with great difficulty that I could get them to understand the cause of her coma, if, indeed, they ever did understand. When we attempt to explain a pathological condition to a lot of lay women, we may think we have made it very plain, but it is "all mud" to them. I am satisfied, however, that if this woman had died they would have thought that *I* killed her.

CASE 2. In this case the woman had already been delivered before my arrival, but was having convulsions, one after another in rapid succession, jumping about from one side of the bed to the other and altogether unmanageable. She was treated with hypodermics of morphine and atropine, full doses, and made a good recovery.

CASE 3. Was that of a young woman in the seventh month of her first pregnancy. When I reached her she had fallen on the floor with a big convulsion and was then in profound coma. I made a saturated solution of Epsom salts and fed her with it, a teaspoonful at a time, every few minutes, until she had taken a liberal supply. I then left her for a time, as I was booked for another place. She had very copious watery discharges, was up the next day and went on to full term.

CASE 4. This case was about seven miles from my office, and the telephone call was to

"come quick." This young woman had already had five convulsions, and was then in profound coma, face purple, breathing labored, and I do not believe she would have lived another hour. Fortunately, the child was near the outlet and was immediately taken out with the forceps. I then gave her a copious enema of Epsom salts and sat down to watch her. She had two more convulsions several hours afterwards, and I gave her a hypodermic of morphine and atropine and made sure that she had full doses of Epsom salts per rectum. She slept until noon the next day, twenty-four hours in all, then asked feebly, if she might have some water. That was the first sign of returning consciousness. She has had two children since and no trouble.

Case 5. A young man who lived ten miles from my home asked me to attend his wife at the birth of her first child, expected in about two weeks. As I had never been called there before, I took it as a compliment and, of course, readily consented. He told me that her feet and ankles were very much swollen so I sent him back home for a specimen of urine. After I made my analysis I told him that I thought it very likely that his wife would have convulsions at the time of her delivery, but of course he must not tell her. He was instructed to give her full doses of Epsom salts every day and bring me specimens of urine every two or three days. This he did. When the time came she did very well for about an hour and then had a convulsion. The labor had made very little progress, the cervix only dilated about the size of a half-dollar and was rather rigid. Now what to do? Of course, the great desideratum was to deliver the child, but how? Everything I could give her to control the convulsions would at the same time control the uterine contractions and stop the labor, whether chloroform, or chloral hydrate, or morphine and atropine, or what not. So I did this: I gave her a full hypodermic of morphine and atropine and about three minims of pituitrin, with inhalations of chloroform, and so on, feeling my way with the pituitrin, oiling the cervix and applying to it also about one-fifteenth of a grain of powdered atropine. The cervix gradually dilated and the push of the pituitrin, little by little, brought the head into the vaginal strait, until I could get hold of it with the forceps. She had five convulsions before delivery, one in the act of delivery and two after the delivery was complete. This procedure took nearly all night, but she made a good recovery and her baby was also safe. I confess that I was very proud of my success in this case, but when she had another baby about two years after that, she didn't call *me* but got another doctor, equally as far from her, and one whom she had never had with her before. Not a word was said to me, but I have always thought that somebody had told them that if some other doctor had been with her the first time she would not have had all that trouble. Such is fame!

But I have given cases enough. Now for some general remarks by way of friendly advice to my fellow practitioners:

(1). Keep cool, think fast and act promptly.

(2). As to bleeding the patient: It is sometimes a very wise thing to do, but not always. The patient may have already lost enough blood, or will do so at the time of birth. It is well to consider that we can't subject all to the same rule. Many a life has been lost by *sticking to the books* too closely.

(3). When there is more than one convulsion, chloral hydrate and sodium bromide, mixed, in full doses, or the inhalation of chloroform, or both, are very valuable. But if there is only one convulsion I would wait awhile before giving any of these.

(4). Hypodermics of morphine and atropine are very useful and always to be thought of when it is found difficult to give anything by the mouth. It may be necessary to give a hypodermic even after a full dose of chloral and bromide. We know that opium produces anemia of the brain, and does *not* increase the coma that follows a puerperal convulsion, but it controls the nerve centers and helps to forestall another.

(5). We must always try to get rid of the urea and other poisons and there is no better way, or safer way, than full doses of Epsom salts, by the mouth if we can, and if not, then by the rectum. In some of the cases I have mentioned this drug was used *ad libitum* and, after arranging to protect the bed as much as possible, we just let the water roll out in a flood.

(6). In case of No. 5, cited above, I have mentioned the use of pituitrin. What else could I do? I *must* deliver the child, and yet I knew that if the pituitrin acted violently the uterus would be ruptured, so I was in the position of a man driving close to the edge of a canyon, with unmeasured depths below. I kept the

syringe loaded and gave about three minims every ten or fifteen minutes and watched the effect. It is a dangerous drug and should be handled with the utmost caution.

(7). Of course if we are spoken to in time we ought to make frequent analyses and see that the woman is in the best possible condition for her approaching trial; but many of these cases are thrust upon us and we must be prepared to do all that ought to be done, or that anybody could do, for the poor woman who has entrusted her life to us. In this paper I have only attempted to give the outline of a few typical cases, with the treatment and the outcome. To enter into a general discussion of the many drugs which have been brought to our attention in the literature on this subject would occupy too much space, and would only be a rehash of theories already familiar to the profession.

Correspondence

May Day—Child Health Day for Virginia, 1927.

March 16, 1927.

To the Editor:

This is to notify the doctors of Virginia that in all probability many of them will be called upon by the rural school teachers to check those pupils who aspire to be called "Five Point" children.

The State Board of Health has offered a five point star banner to the school in each county which has the highest percentage of Five Point children.

What is a Five Point Child?

A "Five Point Child" is one who measures up to the present minimum standard set by the State Board of Health and State Board of Education, as indicated by physical inspection of the following five points:

1. Vision
2. Hearing
3. Teeth
4. Throat
5. Weight

How Do We Find the Five Point Child?

The West law, which the Legislature passed in 1920, requires the physical inspection on these points of all school children. A detailed explanation of the inspection is:

Vision—Child reads line marked 20 on the Snellen eye testing chart at a distance of 20 feet (each eye tested separately), or has glasses which are properly fitted.

Hearing—Child hears conversational voice at a distance of 20 feet. (Each ear tested separately).

Teeth—Teeth reasonably clean, no exposed roots or unfilled cavities.

Throat—Child has no symptoms of trouble with tonsils and adenoids; not a mouth-breather. (Preferably checked by a doctor).

Weight—Child is not 10% or more underweight, or not 20% or more overweight.

Why Have This Five Point Standard for Children?

Because even a slight defect in any one of these five points, if not corrected, may seriously hamper the child's health during school days, and have a very harmful effect in later years. The child in good health is a better pupil, and the man or woman in good health is a better citizen.

Before the award is made in a county, all children selected by the teacher as Five Point children must be checked by a doctor, or a nurse if no doctor is available. All children declared by the local doctor or nurse to be "Five Pointers" will be given a five point certificate on May Day—Child Health Day.

When a doctor is requested to check these children, the following procedure is suggested for him:

Ask the teacher for the physical inspection record cards of pupils selected as Five Pointers. Go over these cards carefully with the teacher and assure yourself that she has confidence in her own findings.

If you and the teacher are satisfied that the vision and hearing tests are reasonably accurate, these tests need not be repeated.

Check up inspection of teeth and throat and compare your findings with the minimum standard. A written statement from the dentist or family doctor may be accepted as a substitute for your verdict.

If the child has been recently weighed and measured by the teacher, her record should be accepted. Find whether each child is 10% underweight or 20% overweight as compared with the Standard Weight Chart in Health

Manual for Teachers, which every teacher has on her desk.

If the child measures up to *all five points* he or she may be awarded the Five Point Certificate.

The cooperation of the doctors will be heartily appreciated; in fact, the success of this undertaking largely depends upon it.

Mary Evelyn Brydon, M. D.,
Virginia Chairman for May Day-Child Health Day,
State Board of Health, Richmond, Va.

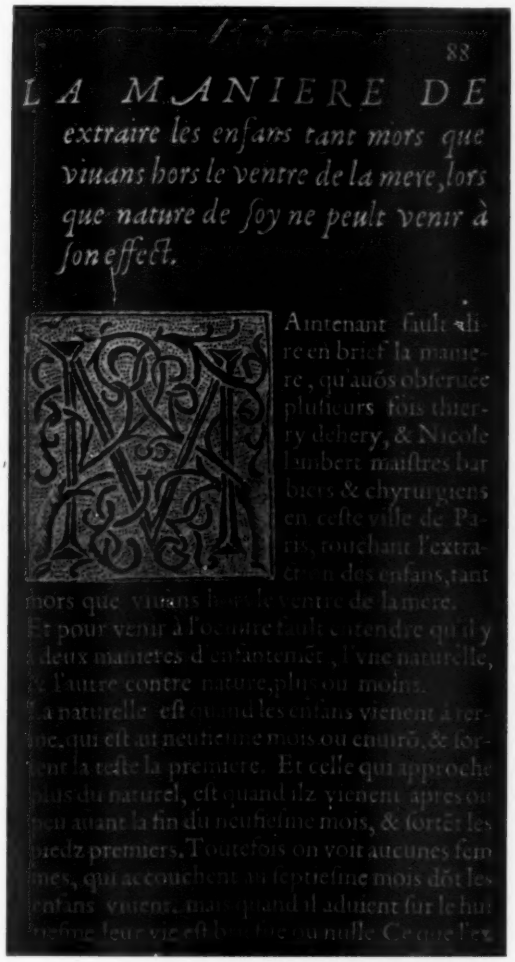
Bibliotheca Obstetrica

Paré

Paré (Ambroise) [1510-90] Briefve collection de l'administration anatomique; avec la maniere de conjoindre les os, et d'extraire les enfers tant mors que vivans du ventre de la mere, lors que nature soy ne peult venir a son effet. 7 p. l., 96 l, 12°. *Paris, G. Cavellat,* 1550. *For Biography, see* Paget (S) Ambroise Paré and his times, 1510-1590. 8° New York and London, 1897. *See also* Packard (F. R.) Life and times of Ambroise Paré, 1510-1590, with a new translation of his apology and an account of his journeys in divers places. New York, 1921.

Scientific obstetrics begins, according to Engelmann, in 1550, with the re-discovery of podalic version by Paré. Before this time the practice of obstetrics was entirely in the hands of midwives, and medical men were called in only to do an embryotomy as a last resort. It is true that podalic version was known in ancient times, but seems to have been performed only after the death of the infant. Soranus in the second century practiced it upon living children, but his teaching had little effect, and after his time the operation even upon dead infants was soon forgotten. With the teaching of version by Pare, medical men had for the first time a way of coping with abnormal presentations, and with their increased usefulness, came greater opportunities of studying the mechanism of labor. We thus see what an important place this little book occupies in the history of modern obstetrics. When we think of the dismal prospect that confronted women with abnormal presentations before 1550, we can readily forgive Paré his inaccuracies. What did it matter if he taught that the pubic bones separated during labor to make room for the advancing head, when he taught how to deliver a woman with a placenta previa or to save the child that presented by the shoulder?

Not only was Paré the greatest teacher of obstetrics of his day, but he was also the foremost surgeon. He ranks among the greatest military surgeons of all time. He is to be remembered especially for the introduction of podalic version, accouchement forcé, more humane methods of treating wounds, artificial limbs, artificial eyes, improvements in the treatment of hernia, and the use of ligatures in amputations.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LA MANIERE DE
extraire les enfans tant mors que viuans hors le ventre de la mere, lors que nature de soy ne peult venir à son effect.

Photostat of the beginning of Chapter on Version.

Paré was born at Bourg Hersent, a little

village that is now a part of the city of Laval. There is considerable traditional evidence that his father was valet de chambre and barber to the Sieur de Laval. His sister, Catherine, married a master barber-surgeon of Paris and a brother was a master barber-surgeon at Vitré. Pare began his medical career probably as an apprentice to a surgeon at Laval named Violet. The next few years were spent either at Angers or with his brother, Jean, at Vitré. When he came to Paris in 1532 or 1533, he was apprenticed to a barber-surgeon. His textbooks were the works of Gui de Chauliac and Jean de Vigo, both of which had been translated from the Latin into French. He very soon became *compaynon chirurgien*, a sort of interne, at the Hotel Dieu. In 1537 he went to Italy, as a military surgeon, with the French army. It was on this campaign that Paré made his great discovery that boiling oil was harmful in the treatment of gun shot wounds. In 1541, after an unsuccessful effort in 1540, he passed his barber-surgeons' examination which allowed him to legally practice in Paris.

Before this, however, Paré had achieved some reputation, for in 1539 the renowned Sylvius sought out the young army surgeon, being particularly interested in his method of treatment of arquebus wounds. Not only had Paré abandoned the until-then-universal use of boiling oil in the treatment of these wounds, but he had been unusually successful in locating the ball by making the patient assume the position he was in when he received the wound. Sylvius urged Paré to publish his observations at this time, but it was not until 1545 that Paré followed his advice. (La methode de traista le playes faictes par hecquebutes et aultres basstons a feu, 1545). The book was reprinted in 1552 and again in 1556. The work established Paré's reputation and after several military campaigns with intervals of study in Paris, he was made one of the surgeons in ordinary to Henry II. In 1554 he was made a member of the College de Saint Come, thus becoming a master surgeon in spite of the fact that he knew no Latin. Paré continued in favor with Henry II and his successors, becoming *premier chirugien to the king* in Charles IX's reign, so that at his death at 80 years he could truthfully boast of having been the surgeon of the King of Navarre and the French kings, Henry II, Francois II, Charles IX, and Henry III.

M. P. R.

Proceedings of Societies

The Nansemond County Medical Society

Held its March meeting in the dining room of Hotel Elliott, at Suffolk, Va., March 7th, with a good attendance of members and dentists and their wives and nurses. Invited guests were Dr. Israel Brown, councilor for that district, and Dr. Frank Hancock, both of Norfolk. A short talk was given by Dr. Brown, and Dr. Hancock gave the address of the evening—The History of Medicine—which was illustrated with lantern slides. This society re-organized about a year and half ago and has been most active since. Dr. W. T. Gay, of Suffolk, is president this year.

Pittsylvania County and Danville Medical Society.

Members of the Pittsylvania County and Danville Medical Society were guests of the Danville Academy of Medicine at a delightful supper on the evening of March 15th. Following the supper, the meeting was called to order by the president, Dr. C. A. Easley, of Chatham, who opened the meeting with a few general remarks about the Society and a brief sketch of the life of Dr. Rawley W. Martin. A paper was read by Dr. Henry J. Langston, several cases were reported by Dr. E. H. Miller, and a talk was given by the city health officer, Dr. R. W. Garnett, on the recent activity of the health department in the administration of toxin-antitoxin for the prevention of diphtheria. Dr. J. Shelton Horsley, president of the Medical Society of Virginia also presented a paper.

Following a discussion of the papers and talks, it was moved and carried that two committees be appointed, one from Danville and one from the rest of Pittsylvania County, to co-operate with the health departments in the administration of toxin-antitoxin for the prevention of diphtheria. The president appointed these two committees. This plan may be a suggestion to other county societies as to the way to assist the State and county health departments.

It was decided to hold the next meeting in Chatham, on Tuesday, June the 13th. Dr. J. A. Hawkins, Danville, is secretary-treasurer of the society.

The Southwestern Virginia Medical Society

Held its regular semi-annual meeting at Pulaski, March 24th and 25th, the president,

Dr. Z. V. Sherrill, of Marion, presiding. There was a subscription banquet on the first evening at Maple Shade Inn, following which the scientific program was taken up. Drs. E. C. S. Taliaferro, Norfolk, L. T. Price and E. G. Williams and Mr. A. H. Straus, of Richmond, invited guests, presented interesting papers on the first evening, and voluntary papers and a symposium on "Acute Abdomen in Children Under Ten Years of Age" were presented by members on the second day. The papers were freely discussed and the meeting was a success in every way. Dr. E. G. Gill, Roanoke, is secretary of the Society.

Boteourt County Medical Society.

Members of this Society and their wives were entertained at their regular meeting on March 8th, at the home of the retiring president, Dr. W. N. Breckinridge, at Fincastle, Va. Dr. and Mrs. Hugh Trout and Dr. and Mrs. Geo. B. Lawson, of Roanoke, were invited guests for this meeting. After luncheon, talks were given by Drs. Trout and Lawson and a business session was held at which time Dr. A. W. Hammond, of Amsterdam, was elected president, and Dr. E. W. Dodd, of Buchanan, secretary.

The Arlington County Medical Society

Held its regular meeting at the home of Dr. Richard N. Sutton, at Clarendon, early in March. At this meeting the Society endorsed the movement launched by the American Legion for the establishment of a hospital in Arlington County. While the site for the proposed hospital was not determined upon, it is probable that Clarendon will be selected. The following officers were re-elected for the ensuing year: President, Dr. H. A. Hornthal, Potomac; vice-president, Dr. Edward McCarthy, Cherrydale; and secretary-treasurer, Dr. B. H. Swain, Ballston.

The Southside Virginia Medical Association

Met in Hopewell, Va., March the 8th, at the Dupont Club, with a good attendance at both morning and afternoon sessions. There was a good program and all papers were freely discussed. Following the morning session, the visiting doctors were given a trip over the industries now at Hopewell and tendered a luncheon. Dinner was given the members and visitors in the evening at City Point Inn, at which time there were speeches and music. The Association selected Emporia for its next meeting which is to be held on the second Tuesday in June. Dr. Wright Clarkson, Petersburg, is president, and Dr. R. L. Raiford, Sedley, secretary-treasurer.

Woman's Auxiliary Medical Society of Virginia

At the request of the officers of the Auxiliary, this space has been set aside for communications from them regarding matters of interest, both to the profession and to the women members of their families.

All communications should be addressed to Mrs. E. F. Truitt, Secretary, Westover Avenue, Norfolk, Virginia.

Invitation to Virginia Women.

The annual meeting of the Woman's Auxiliary to the American Medical Association will be held in Washington, May 16th to 20th, with headquarters at the Mayflower Hotel.

This meeting is so near home that the Virginia women should make every effort to attend. Your presence will not only help the meeting but will be a great inspiration to yourselves. If you have never attended an American Medical Association Woman's Auxiliary meeting, you cannot realize the pleasure and help that can be obtained from contact with those splendid women, wives of the most prominent doctors from all over our country, and it is a pleasure to know the officers of the National Auxiliary.

Now is the time for every county member and every individual, whether she is a member of the Auxiliary or not, to make plans to go in person to this meeting.

There are only two delegates appointed to vote for Virginia, but each county Auxiliary can appoint its own representative to bring back the message to those unable to go to Washington.

A cordial and pressing invitation is extended to each and every one, and it is hoped that the Virginia women will attend *en masse*. Urge your husbands to take you. Now is your opportunity. Seize it. Obey that impulse. A great privilege awaits each one of you.

MRS. SOUTHGATE LEIGH,
Chairman, National Intertainment Committee.

The Truth About Medicine

In addition to the articles enumerated in our letter of January 29th, the following have been accepted:

Eli Lilly & Co.
- Ricinoleated Antigen, Scarlet Fever, Immunizing—Lilly.

National Aniline & Chemical Co.
- Tablets Gentian Violet Medicinal—"National," 0.0324 Gm. (½ grain).
- Enteric Coated Tablets Gentian Violet Medicinal—"National," 0.0324 Gm. (½ grain).

Parke, Davis & Co.
- Glaseptic Ampoules Sodium Cacodylate—P. D. & Co.
- Glaseptic Ampoules Sodium Cacodylate—P. D. & Co., 0.5 Gm. (¾ grain), 1 c.c.
- Glaseptic Ampoules Sodium Cacodylate—P. D. & Co., 0.10 Gm. (1½ grains), 1 c.c.
- Glaseptic Ampoules Sodium Cacodylate—P. D. & Co., 0.13 Gm. (2 grains), 1 c.c.
- Glaseptic Ampoules Sodium Cacodylate—P. D. & Co., 0.20 Gm. (3 grains), 1 c.c.
- Glaseptic Ampoules Sodium Cacodylate—P. D. & Co., 0.3 Gm. (5 grains), 1 c.c.
- Glaseptic Ampoules Sodium Cacodylate—P. D. & Co., 0.45 Gm. (7 grains), 1 c.c.
- Glaseptic Ampoules Sodium Cacodylate—P. D. & Co., 1 Gm. (15 grains), 2 c.c.
- Glaseptic Ampoules Sodium Cacodylate—P. D. & Co., (for intravenous use), 0.20 Gm. (3 grains), 5 c.c.
- Glaseptic Ampoules Sodium Cacodylate—P. D. & Co., (for intravenous use), 0.45 Gm. (7 grains), 5 c.c.
- Glaseptic Ampoules Sodium Cacodylate—P. D. & Co., (for intravenous use), 1 Gm., (15½ grains), 10 c.c.

Swan-Myers Co.
- Cosmos Concentrated Pollen Extract—Swan-Myers; Dandelion.
- Concentrated Pollen Extract—Swan-Myers; Palmer's Amaranth.
- Concentrated Pollen Extract—Swan-Myers.

The United Laboratories
- Culture Bacillus Acidophilus—United Laboratories.

Nonproprietary Articles
- Ricinoleated Scarlet Fever Antigen.

NEW AND NON-OFFICIAL REMEDIES

Saf-T-Top Mercurochrome Solution.—An aqueous 2 per cent solution of mercurochrome—220 soluble (New and Non-official Remedies, 1926, p. 249), in ampules containing 2 c.c. and having a capillary opening. Robert A. Bernhard, Rochester, N. Y.

Bismuth Salicylate in Oil—P. D. & Co.—A suspension of bismuth salicylate U. S. P. (New and Non-official Remedies, 1926, p. 97), in a liquid composed of camphor, 10 per cent; creosote, 10 per cent; olive oil, 80 per cent. Each c.c. contains bismuth salicylate, 0.13 Gm (2 grains). Parke, Davis & Co., Detroit.

Glaseptic Ampules Bismuth Salicylate in Oil—P. D. & Co., 1 c.c.—Each ampule contains 1 c.c. of a suspension of bismuth salicylate U. S. P. (New and Non-official Remedies, 1926, p. 97), 0.13 Gm. (2 grains) in a liquid composed of camphor, 10 per cent; creosote, 10 per cent; olive oil, 80 per cent. Parke, Davis & Co., Detroit.

Concentrated Pollen Extracts—Swan-Myers.—In addition to the products listed in New and Non-official Remedies, 1926, p. 28, the following have been accepted: Cosmos Concentrated Pollen Extract—Swan-Myers; Dandelion Concentrated Pollen Extract—Swan-Myers; Palmer's Amaranth Concentrated Pollen Extract—Swan-Myers. Swan-Myers Co., Indianapolis.

Erysipelas Streptococcus Antitoxin—Lilly (Concentrated Globulin).—An erysipelas streptococcus antitoxin (Jour. A. M. A., August 28, 1926, p. 671), obtained by injecting horses subcutaneously with strains of hemolytic streptococci obtained from Dr. A. R. Dochez from human cases of erysipelas lesions, bleeding the horses, and when test bleedings show the serum to have reached the desired potency, bleeding as plasma which is concentrated and refined. Marketed in syringe containers (therapeutic dose), containing 5,000 "units." Eli Lilly & Co., Indianapolis. (Jour. A. M. A., Feb. 5, 1927, p. 403).

Antistreptococcic Serum (New and Non-official Remedies, 1926, p. 339).—This product is also marketed in 20 c.c. and 50 c.c. piston syringes. Parke, Davis & Co., Detroit.

Tablets Gentian Violet Medicinal—"National," 0.0324 Gm. (½ grain).—Each tablet contains Gentian Violet Medicinal—"National" (New and Non-official Remedies, 1926, p. 167), 0.0324 Gm. (½ grain). National Aniline and Chemical Co., New York.

Enteric Coated Tablets Gentian Violet Medicinal—"National," 0.0324 Gm. (½ grain).—Each tablet contains Gentian Violet Medicinal—"National" (New and Non-official Remedies, 1926, p. 167) 0.0324 Gm. (½ grain), and is coated with phenyl salicylate containing some keratin. National Aniline and Chemical Co., New York.

Ricinoleated Scarlet Fever Antigen.—A bacterial vaccine detoxified with sodium ricinoleate according to the method of Dr. W. F. Larson. Enough favorable evidence has accumulated to indicate that this preparation is worthy of clinical trial by physicians. The antigen is used for active immunization against scarlet fever.

Ricinoleated Scarlet Fever Antigen Immunizing—Lilly—This product is prepared from whole broth cultures of scarlet fever streptococci, containing 1,000 million organisms in each c.c. modified with 2 per cent of sodium ricinoleate. It is marketed in 1 c.c., 5 c.c. and 20 c.c. vials. Eli Lilly & Co., Indianapolis. (Jour. A. M. A., Feb. 19, 1927, p. 567).

PROPAGANDA FOR REFORM

Spahlinger Treatment of Tuberculosis.—Notwithstanding the fact that the Spahlinger treatment of tuberculosis was secret and that evidence in its favor had not been made generally available, Spahlinger and his friends have repeatedly attempted to secure government endorsement of the preparation in England and to secure funds for its development. Now the records of ten patients injected by Spahlinger personally with this remedy have been reported by Dr. Thomas Nelson in the *London Lancet*. These records are decidedly unfavorable to the treatment. The evidence in favor of the Spahlinger method of treatment of tuberculosis is not sufficient at this time to warrant an extensive trial. The burden of proof is still on Spahlinger, who should at least show that in a considerable number of cases studied under controlled conditions the remedy will accomplish more than can be accomplished by the method of treatment now practiced in well regulated institutions for the treatment of tuberculosis. (Jour. A. M. A., Jan. 22, 1927, p. 248).

Chemical Examination of Ethylene for Anesthesia.—In consideration of the recently reported deaths from ethylene anesthesia, the A. M. A. Chemical Laboratory decided to re-examine the brand of ethylene for anesthesia accepted for New and Non-official Remedies, namely, that of the Ohio Chemical and

Manufacturing Co. As the Kansas City Oxygen Gas Co. has just submitted its product to the Council, this brand was also examined. The brand of ethylene which was used in the fatal cases was not examined and is not one of the brands reported on. The specimens were examined according to the methods of New and Non-official Remedies and in addition submitted to a more delicate test for carbon monoxide. They met the standards and in none was carbon monoxide found to be present. The Laboratory recommends that physicians use only the brands of ethylene which stand accepted for inclusion in New and Non-official Remedies. (Jour. A. M. A., Jan. 29, 1927, p. 322).

Rattlesnake Poison.—According to Afranio Do Amaral, "A General Consideration of Snake Poisoning," the use of potassium permanganate in the treatment of rattlesnake bite, is of little value. Specific treatment with potent antivenin is generally admitted to be efficient, and the only means of neutralizing the poisons and arresting the action of the toxic elements. During the last summer a few tubes of anticrotalic serum prepared in Brazil were used with promising results in Texas. (Jour. A. M. A., Jan. 29, 1927, p. 342).

The Florence Laboratories Fraud.—The federal authorities have issued a fraud order closing the mails to the Florence Laboratories, the Florence Produce Corporation and F. H. Shearer. The evidence brought out that Mrs. Shearer exploited three nostrums, an asthma remedy, an eye tonic and a cod-liver oil preparation. The asthma nostrum—Florence Formula—was a potassium iodide and Fowler's Solution combination; the eye tonic, which seems to have been known as "Eyrone" contained glycerin, procaine, boric acid, zinc sulphate and salicylic acid, while the cod-liver oil tablets contained cod-liver extractives, with alleged vitamin A and vitamin B material. The remedies were prepared by George A. Breon & Co., Manufacturing Chemists, Kansas City, Mo. (Jour. A. M. A., Jan. 29, 1927, p. 340).

Radithor.—"Radithor" is the name of the latest nostrum in which William J. A. Bailey is interested. It is being exploited by means of elaborate booklets and also through what purports to be a book, entitled "Modern Rejuvenation Methods," by one Charles Evans Morris, M. D. Radithor is exploited by the somewhat imposingly named Bailey Radium Laboratories, East Orange, N. J., of which William J. A. Bailey seems to be the chief. Two or three years ago, Bailey was president and one of the incorporators of the "Associated Radium Chemists, Inc.," which put out "Arium Tablets." Bailey also, it appears, was connected with the Thorone Company, which sold "Thorone Tablets," claimed to be more radioactive than radium. Later, Bailey was connected with the American Endocrine Laboratories, which exploited what was originally called the "Radiendocrinator" and sold first for one thousand dollars and later for one hundred and fifty dollars. (Jour. A. M. A., Jan. 29, 1927, p. 343).

The Organism of Rheumatic Fever.—A report of the isolation of the specific organism causing rheumatic fever has been published and also the results of trials with an antiserum. Streptococcus cardioarthritidis, the name given to the organism which was isolated from the blood culture of only two patients with rheumatic fever, differs in only one respect from the usual nonhemolytic streptococcus. The claim of the relation of the organism to rheumatic fever appears to rest chiefly on the results obtained from treating patients with an antiserum prepared by immunizing a horse with this streptococcus. The case reports are not convincing. Favorable reports with a serum prepared by immunizing horses with culture of streptococci isolated from throats of rheumatic fever patients have been published previously; they were probably due to a nonspecific reaction. Since then, curative effects have been reported from the use of various forms of nonspecific protein preparations. (Jour. A. M. A., Feb. 5, 1927, p. 405).

Ovacoids and Testacoids.—The advertising claims made for these preparations of Reed and Carnrick are typical of those made by this firm for products examined by the Council on Pharmacy and Chemistry and denied admission to New and Non-official Remedies in 1907. Ovacoids and Testacoids are stated to be "the hormones or autocoids of the sex glands in high concentration, and *active by mouth!*" Ovacoids is stated to "represent the hormones of the entire ovary in highly concentrated form, associated with the hormones of the anterior pituitary and with phosphorus in organic combination." Testacoids are claimed to contain "in addition to the testicular hormones, . . . the hormones of the prostate gland and organic phosphorus." The use of these preparations is irrational and dangerous because the character of the ingredients and their amounts is not declared. The administration of organic phosphorus is not only irrational but superfluous. Though indefinite and semisecret, the composition of Ovacoids and Testacoids is sufficiently specific to place the preparations in the class of pluriglandular mixtures, to the menace of which the Council on Pharmacy and Chemistry has repeatedly called attention. The most important ingredient of Testacoids is apparently a testicular extract. Such preparations are not accepted for New and Non-official Remedies and their therapeutic value has not been demonstrated. There is nothing in the claimed composition of Testacoids to furnish a basis for the extensive claims made for the preparation. (Jour. A. M. A., Feb. 5, 1927, p. 422).

Spengler Treatment of Tuberculosis.—The Spengler immune blood treatment of tuberculosis is a method based on the principle of passive immunization. In 1908, Carl Spengler announced his theory that red blood cells play an important part in immunity to tuberculosis, immune substances being contained within the stroma of the erythrocytes of the resistant animal. He reported favorable results with his preparation "Spengler's I. K." The method has had only small support. From the published reviews it may be concluded that the method is not of value. (Jour. A. M. A., Feb. 5, 1927, p. 425).

Ephedrine.—The Council on Pharmacy and Chemistry states that the reports which have been issued since its first report was published, warrant the acceptance of the drug for New and Non-official Remedies and the recognition of acceptable brands if the firms which market them will agree to be conservative in their claims. The Council report is accompanied by a report of the A. M. A. Chemical Laboratory on the establishment of standards for ephedrine hydrochloride and ephedrine sulphate. The Laboratory's report shows that the ephedrine hydrochloride of the Abbott Laboratories and of Burroughs, Wellcome & Co. meet the provisional standards, but that a pure sulphate has not yet been prepared. However, it appears that the study which is being made in the laboratories of Eli Lilly & Co., gives promise that a satisfactory product will shortly be available. The Council (1) endorsed the report of the A. M. A. Chemical Laboratory and provisionally adopted the submitted standards for ephedrine hydrochloride; (2) it admitted ephedrine to New and Non-official Remedies; (3) it voted to accept the ephedrine

hydrochloride of the Abbott Laboratories when acceptable advertising is issued; (4) it voted to accept the ephedrine hydrochloride of Burroughs, Wellcome & Co., when it is marketed in the United States and acceptable advertising is issued; and (5) it voted to accept Ephedrine Sulphate—Lilly (formerly called "Fedrin") when the firm has achieved satisfactory standards and when the advertising is found acceptable. (Jour. A. M. A., Feb. 12, 1927, p. 482).

Some Miscellaneous Nostrums.—The A. M. A. Chemical Laboratory reports the analysis of the following: Balzone Treatment for Tuberculosis, exploited by one N. L. Waelchli, Denver, Colorado, appeared to be essentially a little colored water into which a few drops of some volatile oil, similar to pine oil, was to be dropped, the water brought to a boil, and the steam inhaled. Spray-O-Zone, exploited by the Coral Chemical Company, Inc., Buffalo, N. Y., appeared to be essentially borax and potassium chlorate dissolved in water. Boals Rolls, exploited by the Boals Rolls Corporation, New York City, consisted of large tablets found to contain starch, figs and phenolphthalein. Harriet Hubbard Ayer's Face Cream, manufactured by Harriet Hubbard Ayer, New York, was found to contain ammoniated mercury and zinc oxide. (Jour. A. M. A., Feb. 12, 1927, p. 501).

The "Adjusto" ("Juvenator").—This is another indecent swindle barred from the mails. One G. R. Damiani, who seems to have done business variously under such trade names as G. Lotto, Olds Appliance, Wisett Manufacturing Co., and Sampson Manufacturing Co., all of St. Louis, Mo., have exploited the device called the "Adjusto" and the "Juvenator." Now a fraud order has been issued against the Sampson Manufacturing Company and G. R. Damiani. (Jour. A. M. A., Feb. 12, 1927, p. 501).

Parathyroid Extract and Lead Poisoning.—Experiments have been made which indicate that parathyroid extract-collip mobilizes from the bones a certain amount of stored lead which is readily available. Since the amounts of lead excreted following this treatment were far greater than those obtained in previous investigations, when ammonium chloride or phosphoric acid were given, the method will probably have some therapeutic value in the treatment of lead poisoning. (Jour. A. M. A., Feb. 19, 1927, p. 572).

The Oritone Laboratories.—"Oritone," an alleged aphrodisiac, sold by the Oritone Laboratories, Kansas City, Mo., has been declared a fraud by the Post Office authorities. Like many other nostrums that have, in the past, been sold by fraudulent medical mail-order concerns, Oritone, according to the government's report, was obtained from George A. Breon and Company, a concern that occasionally appeals to physicians in the pose of a reputable pharmaceutical house. The formula, according to the federal authorities, was: gaduol, 1 mm., thyroid substance, 1/12 gr., lecithin, ⅛ gr., suprarenal substance, 1/5 gr., extract nux vomica, 1/6 gr., pituitary substance, 1/24 gr., yohimbine hydrochloride 1/12 gr. The evidence of the federal authorities showed that the use of the drugs contained in Oritone, either singly or in combination, will not and cannot relieve or cure "lost manhood" or rejuvenate the aged. (Jour. A. M. A., Feb. 19, 1927, p. 585).

Medicago Sativa and Medicago Abrus Compound.—According to the advertising of M. L. Howe, Indianapolis, each tablet of Medicago Sativa (Howes') is "equivalent to 120 gr.", presumably of Medicago sativa. Each tablet of Medicago Abrus Compound is said to contain Abrus precatorius 2 gr. and Medicago sativa 10 gr. In the price list, Medicago Sativa (Howes') is said to be "Tonic, Aphrodisiac, Diuretic, Galactagogue. Especially indicated in prostatic troubles, and cystitis, or any pus condition of the genito-urinary tract, including gonorrhea." The advertising states further that the firm has reports of its great benefit in diabetes. The firm further states that the combination contained in the Medicago Abrus Compound gives a remedy unsurpassed for diabetes. Medicago Sativa is a botanical name for the plant that yields alfalfa. Abrus precatorius is a name for Jambul seed. The value of "Medicago Sativa (Howes')" may be estimated by the following from a report of the Council on Pharmacy and Chemistry: "Alfalfa is a good cattle feed, but only nostrum exploiters have suggested its use as a medicine for human beings." Jambul was in vogue many years ago as a remedy for diabetes. It was tried, found wanting, and relegated to the therapeutic scrap heap. (Jour. A. M. A., Feb. 19, 1927, p. 588).

Deterioration of Anesthetic Ether.—According to the U. S. Pharmacopeia X: "Ether to be used for anesthesia must be preserved only in small, well closed containers, and is not to be used for this purpose, if the original container has been opened longer than twenty-four hours." The impurities found in ether are due to the presence of air and moisture, and the action of daylight, which leads to complex oxidations. Among the products found are hydrogen peroxide and most commonly irritant aldehyde. (Jour. A. M. A., Feb. 19, 1927, p. 588).

Uselessness of Insulin by Inunction.—Attempts to give insulin by mouth, perlingually, by duodenal tube, intratracheally, by inhalation, and by rectum, either in solution or in suppositories, have given results which in the main are either mechanically difficult, inconclusive, inconstant, or wasteful of the drug. An investigation has recently been made to decide whether insulin inunctions would be of any value in the treatment of human diabetes. As much as 1,000 units of insulin dissolved in almond oil was rubbed for a period of one hour into the skin of the abdomen, chest and arms with entirely negative results. Other vehicles were used with equally negative results. On the basis of this evidence the conclusion must be that insulin inunctions "are useless as a therapeutic measure." (Jour. A. M. A., Feb. 26, 1927, p. 652).

Book Announcements

Report on Third International Congress of Military Medicine and Pharmacy. Paris, April, 1925. By COMMANDER WILLIAM SEAMAN BAINBRIDGE, M. C., U. S. Naval Reserve Forces, Member of Permanent Committee, Delegate from the United States. Reprinted from *The Military Surgeon*, May to August, 1926, inclusive. Washington, D. C. 1926..

Diseases of Women. By HARRY STURGEON CROSSEN, M. D., F. A. C. S., Professor of Clinical Gynecology, Washington University Medical School, and Gynecologist in Chief to the Barnes Hospital and the Washington University Dispensary, St. Louis, etc. Sixth Edition, revised and enlarged. St. Louis. The C. V. Mosby Company. 1926. Octavo of 1005 pages, with 934 engravings, including one color plate. Cloth. Price, $11.00.

Physiology and Biochemistry in Modern Medicine. By J. J. R. MACLEOD, M. B., LL. D. (Aberd.), D. Sc. (Tor.), F. R. S., Professor of Physiology

in the University of Toronto, Toronto, Canada; formerly Professor of Physiology in the Western Reserve University, Cleveland, Ohio. Assisted by Roy G. Pearce, A. C. Redfield, N. B. Taylor, and J. M. D. Olmsted and by others. Fifth Edition. St. Louis. The C. V. Mosby Company. 1926. Octavo of 1054 pages, with 291 illustrations, including nine plates in colors. Cloth. Price, $11.00.

An Introduction to the Practice of Preventive Medicine. By J. G. FITZGERALD, M. D., LL. D., F. R. S. C., Professor of Hygiene and Preventive Medicine and Director School of Hygiene and Connaught Laboratories, University of Toronto. Assisted by PETER GILLESPIE, M. Sc., C. E., M. E. I. C., Professor of Civil Engineering, University of Toronto, and H. M. LANCASTER, B. A. Sc., Chief Dominion Analyst, Department of Health, Canada, Ottawa, etc., and Chapters by Andrew Hunter, A. H. W. Caulfield, J. G. Cunningham, and R. M. Hutton. Second Edition. St. Louis. The C. V. Mosby Company. 1926. Octavo of 792 pages. Cloth. Price, $7.50.

Shell Shock and Its Aftermath. By NORMAN FENTON, Ph. D., Associate Professor of Psychology, Ohio University; formerly at Base Hospital 117, A. E. F., and with the National Committee for Mental Hygiene, with an Introduction by THOMAS W. SALMON, M. D., Professor of Psychiatry, Columbia University; formerly Senior Consultant in Neuropsychiatry, A. E. F., and Medical Director of the National Committee for Mental Hygiene. St. Louis. The C. V. Mosby Company. 1926. Octavo of 173 pages. Cloth. Price, $3.00.

The Normal Child and How to Keep it Normal in Mind and Morals. Suggestions for Parents, Teachers and Physicians; with a Consideration of the Influence of Psychoanalysis. By B. SACHS, M. D., New York. Paul B. Hoeber, Inc., New York. 1926. 111 pages. Price $1.50.

Practical Surgery of the Joseph Price Hospital. By JAMES WILLIAM KENNEDY, M. D., F. A. C. S., Surgeon to the Joseph Price Hospital, Philadelphia; formerly in charge of the Gynecological and Obstetrical Department of the Philadelphia Dispensary, etc. Philadelphia. F. A. Davis Company, Publishers. 1926. Octavo of 861 pages. Illustrated with 129 original half-tone plates. Some in colors. Cloth. Price, $10.00 net.

Transfusion of Blood. By HENRY M. FEINBLATT, M. D., Assistant Clinical Professor of Medicine, The Long Island College Hospital, Brooklyn, N. Y.; Author of "Clinical Laboratory Medicine," etc. New York. The Macmillan Company. 1926. Octavo of 137 pages. Illustrated by twenty-four engravings. Cloth.

International Clinics. A Quarterly of illustrated Clinical Lectures and Especially Prepared Original Articles in all Branches of Medicine and Surgery. By Leading Members of the Medical Profession throughout the World. Edited by HENRY W. CATTELL, M. D., Philadelphia. VOLUME IV. Thirty-sixth Series, 1926. Philadelphia and London. J. B. Lippincott Company. 1926. Octavo of 308 pages with illustrations. Cloth.

Betterment of Life Insurance Service. Proceedings of the Twentieth Anniversary Convention of The Association of Life Insurance Presidents. Held in the Hotel Astor. New York, N. Y., December 9 and 10, 1926.

Four Thousand Years of Pharmacy. An Outline History of Pharmacy and the Allied Sciences. By CHARLES H. LaWALL, Ph. M., Phar. D., Sc. D., F. R. S. A., Professor of Theory and Practice of Pharmacy and Dean of the Philadelphia College of Pharmacy and Science; Joint Editor of the Seventh Edition of Remington's Practice of Pharmacy; Member of the Revision Committee of the U. S. Pharmacopeia, etc. Philadelphia and London. J. B. Lippincott Company. Octavo of 665 pages, with 64 illustrations, mostly from original sources. Cloth. Price, $5.00.

The Specialties in General Practice. Compiled by FRANCIS W. PALFREY, M. D., Instructor in Medicine at Harvard University. In Collaboration with various authors. Philadelphia and London. W. B. Saunders Company. 1927. Octavo of 748 pages. Cloth. Price $6.50 net.

If the welfare of the patient is the ultimate ideal in the practice of medicine then it seems to us the doctor's horizon of knowledge should be extended rather than circumscribed, as seems the tendency in this era of highly developed specialization.

As a means to this end Dr. Palfrey, in collaboration with fourteen of the leading teacher-specialists of Harvard University Medical Department, has prepared an unusual book covering the specialties: Dermatology, Urology, Gynecology, Eye, Ear, Nose, Throat, Orthopedics, Pediatrics, Psychiatry and Surgery—an average of sixty-five pages to each specialty.

A doctor may be justified in refusing to treat conditions outside his domain but the patient is surely entitled to expect that he should have a reasonable knowledge of the ordinary afflictions to which humanity is subject. A pathetic case illustrative of this deficiency: A woman past fifty years of age was being treated for rheumatism; as a last resort the family physician advised a trip to Hot Springs. There a casual examination revealed an ordinary case of so-called flat-foot. It is not too much to say that any doctor should be able to recognize this condition—at least to advise a patient where to go for treatment.

For the doctor, be he a general practitioner or specialist, who wants to be helpful to his patients, here is a book of surpassing merit, as it embraces at least "what every doctor should know." H.

The Modern Practice of Pediatrics. By WILLIAM PALMER LUCAS, M. D., LL.D., Professor of Pediatrics, University of California Medical School; Author of "The Health of the Runabout Child," "Children's Diseases for Nurses," etc. New York. The Macmillan Company. 1927. Octavo of 962 pages. Illustrated. Cloth. Price $8.50.

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Editorial

Goiters.

One may use the plural in discussing this subject because the classification of goiter is a matter of extreme importance. Like many other medical problems in disease, so much has been written, and so many angles of approach have been taken, that the classification of goiter disease-entities has never yet become standardized. In fact, the misunderstanding of the nature of goiters and the causes of them, has brought about a wide difference of opinion in the classification by various writers. But for our purposes, at this time, we shall turn to Plummer as our referee and source for much that is submitted in this column in the discussion of disease of the thyroid and the use of iodin. Plummer's paper in the 1925 Collected Papers of the Mayo Clinic, beginning on page 475, is the article to which we refer and it is recommended to our readers.

The best grouping of thyroid-disease, as we understand it today, can be obtained by classifying goiters into two general types: I. Endemic, and II. Exophthalmic; by subdividing endemic goiters into (1) diffuse colloid and (2) adenomatous; and, further by grouping adenomatous goiters into (a) those with hyperfunction and (b) those without hyperfunction.

Diffuse colloid goiter results from storage of an excess of colloid substance. Iodin, being inadequate for thyroid functioning, with a resulting deficiency in thyroxin output, hypothyroidism is produced. This brings about extraordinary thyroid action and hypertrophy. This alters the secretory processes of the gland and there results storage of colloid in excess of normal. Iodin, therefore, either relative or absolute, seems necessary for normal thyroid function and its absence stimulates the deposition of colloid, with a resultant hypothyroidism and a lower basal metabolic rate. Colloid goiter, in majority of instances, occurs in latter half of the second decade.

Adenomatous goiter results from a sustained stimulation of the thyroid in conjunction probably with unknown factors. Adenomatous goiter and nodular goiter, used synonymously, either elaborates and puts out an excess of thyroxin or stimulates surrounding thyroid tissue to hyperfunction of this substance. The actual process is not known but it is supposed that adenomatous tissue is characterized by over-function of thyroxin.

The evolution of adenomatous goiter reaches back in colloid goiter, oftentimes. Compensating ultimately, adenomatous tissue, at first, elaborates and stores colloid; later, in the latter half of the third decade becomes hyperfunctional in the production of thyroxin. Only 5 per cent, for instance, adenomatous thyroids in the Mayo Clinic, are under thirty years of age; although there may have been thyroid enlargement observed, for some years prior to this period—conceivable during colloid era.

Hyperthyroidism of adenomatous goiter is probably due to an excess of the normal active agent of the thyroid in body tissues: because the early signs are those merely of an elevation of metabolism. These reactions disappear promptly, in three weeks after an enucleation of adenoma; like reactions are noted following administration of desiccated thyroid or thyroxin in normal persons.

Exophthalmic goiter results from an intensive stimulation of an unknown origin, primarily of a normally functioning thyroid. This produces a diffuse hypertrophy, capable of an abnormal amount of thyroxin elaboration; "under this unknown stimulation, acini, which are possibly more or less new, develop." But this is distinguishable and different from adenomatous tissue "frequently present before the onset of exophtholmic goiter." In the Mississippi Valley, where incidence of endemic goiter is high, 30 per cent of exophthalmic goiters are superimposed on adenomatous goiters. Much speculation has arisen over the effort to discover the nature of this unknown factor in exophthalmic goiter. This unknown factor probably produces the ocular signs, the

nervous phenomena and the crises of the disease.

The hypothesis, that these characteristic symptoms of exophthalmic goiter are due to an abnormal agent, in addition to a total and relatively normal secretion of the gland, is the one which assumes the incomplete iodized thyroxin molecule to be elaborated and driven from the over stimulated gland. It appears then, to restate the theory that an unknown stimulation produces hyperplasia of thyroid cells; that this enlarged thyroid produces thyroxin plus an abnormal product; that these, total and relative amounts of thyroxin and the abnormal product, delivered from the thyroid, are determined by the intensity of thyroid stimulation of iodin supply and compensatory functional accomplishments of the thyroid gland itself.

Thus the exophthalmic goiter produces an excess amount of thyroxin which, in turn, brings about an increase of basal metabolic rate; it also produces in connection with the stimulation of goiter cells an unknown agent (may be, an incompletely iodized thyroxin molecule) which, coincidentally, excites certain specific ocular and nervous symptoms. The alternations of exacerbations and remissions in these symptoms are attributed to fluctuations in elaborations of this unknown perverted thyroid secretion. The basal metabolism curve may run parallel with these exacerbations of specific symptoms, but it may not. This is explained on the two product theory in the etiology of exophthalmic goiter by varying intensity of thyroid stimulation, through the iodin supply, through the fatigue or compensation in function of thyroid, as well as through unknown conditions.

Iodin Administration in Goiters.

In view of the foregoing observations on goiters of several classes, all of which have relation to iodine utilization in the production of thyroid secretion (thyroxin), so essentially connected with body metabolism, energization, and well-being, it appears not unwise to comment briefly upon the administration of iodin in each of the types of goiter; endemic and exophthalmic. There are definite benefits to be derived in iodin administration in some ways; and there are, contrary-wise, harmful effects produced in iodin administration in other ways. In 1914, 1917 and 1918, Kendall separated, determined and proved the chemical formula of the active agent of the thyroid, and called it, thyroxin. Thyroxin is by weight 65 per cent iodin. Thyroid receives its iodin from the blood and elaborates thyroxin. The thyroid delivers thyroxin to the blood for distribution in the body cells; where it performs its catalytic function in metabolism. Thyroxin, in normal persons, is hence active in all the cells of the body; it hastens the rate "of formation of a quantum of potential energy available for transformation on excitation of cells". The average normal person has about 14 mg. of thyroxin, but thyroid delivers only approximately 0.33 mg. of thyroxin daily. There probably exists here, as in all other organs, a wide margin of reserve and powers of compensation.

The state of hypothyroidism stimulates thyroid cells to produce thyroxin and intensive thyroxin manufacture is instituted and, unless an adequate iodin supply is forthcoming, thyroid cell function is strained. Diffuse hypertrophy of cells results. Upon such a general thyroid stress as hereby brought about, pathologic changes follow, resulting early in colloid deposit, later in adenomatous, and exophthalmic goiters. Each goiter sets up a train of symptoms as displayed by a low basal metabolic rate and myxedema, of colloid goiter; in high metabolic rate and nervousness, and structural changes of adenomatous (toxic) goiter; in high metabolic and low metabolic rates, with specific ocular and nervous syndromes, and crises of exophthalmic goiter.

Iodin in Colloid Goiter.

Iodin administration hence plays a telling part in the prevention and alleviation of early and primary colloid enlargement. In colloid goiter, with its deficiency of thyroxin output, iodin is helpful and curative. Iodin treatment in goiter dates back to ancient history, for its use in enlarged thyroid cases had been found efficacious. Reduction in size and disappearance of goiter, during and following its use, had warranted the opinion that it was curative. But no adequate discrimination had been made. Some enlarged thyroid cases it was noted were not improved; some appeared to be made worse following its prolonged use. The conflicting results made for confusion and iodin was considered an unreliable therapeutic agent. This occurred because of a failure to understand the types and pathogenesis of the thyroid enlargement. It was this differ-

entiation, that the work of Plummer, Kendall, Marine and Kimball, McCarty and others clarified and placed iodin therapy in goiter on a more rational basis.

Iodin in Adenomatous Goiter.

Plummer says on this subject, "I am still of the opinion that administration of iodin causes adenomatous thyroids to hyperfunction." He further says that the treatment of hyperfunctioning adenomatous thyroids is essentially surgical. On these two statements one may rest the case of nodular (toxic) adenomatous thyroid. But the question of mixed colloid, and adenomatous hyperfunctioning, thyroid and the use of iodin can only be settled by a careful diagnostic inquiry in basal metabolic rate. It is very likely true that some colloids, which are beyond the adolescent stage, mixed with adenomatous pathology, are stimulated to hyperfunction by the over-use of iodin. In this way an innocent thyroid may be made toxic.

In no period of life is there needed a more careful diagnostic inquiry in all goiter cases than in the second and third decade. Adenomatous goiter producing an excess of thyroxin, shows an increased metabolic rate. Iodin in these cases is extremely harmful. In all adenomatous goiters, basal metabolism is needed to aid in determining the fact whether or not there is already hyperfunction.

After all, adenomatous goiter is essentially a surgical condition.

Iodin in Exophtholmic Goiter.

Plummer believes that iodin has a place here. Iodin and surgery work best together in these cases. He gives iodin in large doses. The use of iodin has decreased the surgical mortality from approximately 3.5 per cent to approximately 1 per cent.

Iodin goes hand in hand with surgery or, at least, it should be administered in large doses before surgery in order to best prepare the patient and afterwards in order to best protect the patient from recurrence of specific symptoms. One may well read Plummer's studies on thus subject and may do well to receive his arguments, therein laid down, with due credence.

A good traffic rule on the road of life:
when you meet temptation,
Turn to the right.

News Notes

Home for Richmond Academy of Medicine.

How long the Richmond Academy of Medicine has been in existence is not known. There is, however, a letter extant, written in 1818, in which the writer, a young physician, tells his correspondent that he hopes to be admitted to membership in a body of that name shortly.

So far as this writer is aware, no records of the organization prior to 1890, exist; but he has been informed that some years previous to that date, a schism occurred, the seceding members forming the Richmond Medical and Surgical Society. Early in 1890, the breach was healed, the Richmond Academy of Medicine and Surgery being the result. In 1923, the original title, the Richmond Academy of Medicine, was re-assumed; and in February, 1927, the organization was incorporated under the laws of Virginia, the incorporators being Drs. J. Allison Hodges, Fred M. Hodges, C. C. Coleman, A. Murat Willis, Stuart Michaux, Mark W. Peyser, James H. Smith, James K. Hall and Stuart McGuire.

The curious one, browsing among the records from 1890 to the present time, would be struck by the fact that every president nursed the hope that the Academy would soon own a home. The frequent change in meeting-place was unsettling and, consequently, no matter how interesting were the programs, the attendance decreased and members lost interest. Another and potent factor contributing to the decrease in attendance was the formation of the staff clubs of the various hospitals.

At times the hope of a home almost was realized. Various committees selected sites that even today would be almost ideal; but even then, though the price of real estate was very low as compared with what obtains at present, the necessary amount was never forthcoming.

It was not until Dr. Joseph L. Miller, of Thomas, West Virginia, of Virginia parentage, and a graduate of the old University College of Medicine, offered his library and collection of medical antiquities on condition that their housing be fireproof, that a few lovers of books, notably Drs. James H. Smith, James K. Hall and Wyndham Blanton, after viewing the rare and magnificent tomes, returned and, like the spies out of Canaan, told in glowing words of the wonders they had seen. Their enthusiasm was infectious; the Board of Trustees recommended acceptance of the gift

and the erection of a fireproof building to house it. The Academy accepted the recommendation, and a committee on library, with Dr. Stuart McGuire as chairman, was appointed. So active has this committee been, that nearly two-thirds of the amount necessary has been subscribed, and plans providing for a library room, committee rooms, lockers, and all other things that go to make such a building complete, are being drafted.

The site chosen is at the northeast corner of Twelfth and Clay Streets, facing fifty feet on Clay and sixty feet on Twelfth Street. An auditorium and library building in harmony with the Academy's home will be erected adjacent to and connecting with it, by the Medical College of Virginia, the two forming a whole; and it is hoped that the group will be ready for occupancy within eighteen months.

The home will face the Confederate Museum, the former White House of the Confederacy. Across Twelfth Street is the main building of the Medical College of Virginia, and diagonally opposite is the handsome structure of the Juvenile and Domestic Relations Court. Other public buildings in the neighborhood are the Valentine Museum, the Virginia Mechanics Institute and the Sheltering Arms Hospital, all forming a sort of civic center.

Certain it is that through pride of ownership, the Academy's usefulness will be heightened, its attendance will be increased and membership therein will be more highly valued; and its unique library and collection of medical antiquities will be a Mecca for those who have the love of books in their hearts.

MARK W. PEYSER.

Councilor in Seventh District.

Dr. B. B. Dutton, Winchester, Va., has been appointed a member of the Executive Council of the Medical Society of Virginia from the Seventh Congressional District, to succeed Dr. Walter Cox, deceased.

American Medical Association.

In slightly over a month, the American Medical Association is to hold its annual meeting in Washington, D. C. It should be a great occasion for Virginia physicians and we count on a large attendance from this State. It being impossible for us to entertain this Association on account of its large attendance, our doctors should consider it a privilege for it to meet practically at our doors and should make an effort to attend as many of the sessions as possible, to imbibe some of the enthusiasm to be derived from such meetings as well as to attend the various sections in which they may be interested.

In addition to the usual scientific and business sessions, there will be entertainments and sight-seeing. The American Medical Golfing Association is also planning a tournament and any male fellow of the American Medical Association is privileged to join the Golfing Association. Applications for enrollment and entries to play should be sent to the Business Secretary, Dr. John L. Walter, 1507 Hunman Avenue, Evanston, Ill., before formal entries close May 1. After that, they should be sent to Dr. W. J. Cusack, 1849 Kalorama Road, Northwest, Washington, D. C.

The Walter Reed Memorial Commission of the Medical Society of Virginia.

At a meeting held in Richmond, early in April, adopted a resolution empowering its chairman, Dr. E. C. S. Taliaferro, of Norfolk, to appoint local chairmen in the various sections of the State to raise $2,500 for the restoration and fencing in of Belroi, home of Walter Reed in Gloucester County, Virginia. The Medical Society of Virginia, at its meeting last Fall, appropriated money for the purchase of this home and the deed has been recorded and properly transferred to the Commission but the house is in urgent need of repairs on account of disintegration from time and souvenir hunters.

Meeting in Washington.

The Walter Reed Memorial Commission will have a general meeting in Washington, during the meeting of the American Medical Association. At this meeting will be representatives from the various State medical societies, to discuss ways and means of raising funds for an endowment in honor of Walter Reed.

May Day—Child Health Day—

Will be celebrated in nearly every community in Virginia some time during the month of May. Governor Byrd has issued a proclamation to this effect and school teachers, health officers and others interested in the welfare of children will assist, that this old Spring Festival may be used to measure the gifts of health and happiness of the children of this State.

Last year, sixty-three counties and fifteen cities had celebrations varying from the individual school festival to the county or city-wide event. It is hoped this year that practically every community in the State may participate in the celebration sometime during the

month of May. On page 52 in this issue of the MONTHLY we are publishing an article about the five-point child and Child Health Day. Other suggestive material for the celebration may be obtained from Dr. Mary E. Brydon, of the State Board of Health, Richmond, Va.

Hygienic Exposition and Medical Congress In Warsaw.

From May 30th through June 4th, there will take place in Warsaw, Poland, the Fourth International Congress of Military Medicine and Pharmacy in conjunction with the International Hygienic Exposition, which will be held from May 30th through June 20, 1927.

The Richmond Pediatric Society,

At its regular meeting, March 31, elected the following officers for the ensuing year: President, Dr. Howard Urbach; vice-president, Dr. Basil B. Jones; secretary-treasurer, Dr. W. Ambrose McGee. At this meeting, papers were read by Drs. Thomas D. Jones and James B. Stone.

Address Future Farmers.

At the father-son banquet of the Courtland (Va.) Farm Sprouts, the latter part of March, Drs. R. L. Raiford, of Sedley, and W. T. McLemore, of Courtland, were among those who gave short talks.

Dr. E. L. Kendig to Run for Senate.

It is announced that Dr. E. L. Kendig, of Victoria, at present State senator from the Ninth Senatorial District, will be up for renomination in the August primary.

Dr. and Mrs. R. T. Givens,

Of Glen Wilton, Va., were recent visitors in Richmond, at which time Dr. Givens was a delegate to the Educational Conference held here.

Married.

Dr. Charles Perry Howze, of Danville, Va., and Miss Hannah Morris Keith, of Fairfax, Va., March 19th.

Dr. S. E. Hughes, Jr., Danville, Va., and Miss Sarah Hall, of Onancock, Va., March 19.

Post-Graduate Clinics.

The first of a proposed series of post-graduate clinics will be held at the University of Virginia Hospital, Charlottesville, Virginia, on Thursday, Friday and Saturday, April 28, 29 and 30, 1927. The clinics, which will be devoted chiefly to diagnosis, will be given by members of the Medical Faculty of the University of Virginia. The last day, Saturday, will be given over to the Virginia Society of Otolaryngology and Ophthalmology, which meets there at that time.

All members of the medical profession are cordially invited to attend. A detailed program of the meeting will be mailed to the physicians of the State.

Badges Used to Stimulate Diphtheria Immunization.

The California State Board of Health announces through a recent *Bulletin* that the city health officer of San Francisco adopted the policy of giving a bright colored button as a badge to each child who has received the three doses of toxin-antitoxin, as a means of stimulating enthusiasm in diphtheria immunization. The bright colored button appeals to the children and its use by some has developed a strong desire for ownership in others.

Hospital Clinical Congress of North America.

Marquette University College of Hospital Administration has announced plans for the holding of the Hospital Clinical Congress of North America the week of June 20th to 24th inclusive, in Milwaukee.

The Rev. C. B. Moulinier, regent of the College of Hospital Administration, states that Marquette University has been working for some time preparing for the congressional exposition. The plan is to set up in the Auditorium in Milwaukee complete working exhibits of modern hospital equipment and demonstrate their use under actual conditions. It will be the first attempt to institute a "working" clinic, demonstrating the most modern advances in hospitalization.

There will be four distinct departments: Hospital, Public Health, Safety and Research. The Congress will be vitally interesting to all persons interested in hospitalization. Many of the most prominent medical and hospital leaders in the country will be in Milwaukee for this Congress.

Saving Children from Diphtheria.

New Haven, Conn., seems to have found a pleasant and effective way to spread the gospel of diphtheria prevention. The health officer sends to each baby in the city on his first birthday a pretty birthday card, with a letter to the parents calling attention to the importance of protecting the child against diphtheria. The city reported but one death from the disease during 1926.

In this connection, the Metropolitan Life Insurance Company reports for the year 1926 a new low death rate for diphtheria among

its policyholders. It asserts that there is no good reason why the mortality from this scourge of childhood should not continue to decrease until it becomes negligible.

Dr. S. G. Miller,

Of the class of '25, Medical College of Virginia, upon completion of his service at the Chesapeake and Ohio Hospital, at Clifton Forge, Va., located at Bacova, Va., where he is physician for the Tidewater Hardwood Corporation.

The Virginia Society of Oto-Laryngology and Ophthalmology

Will hold its annual meeting in Charlottesville, April 30, 1927, under the presidency of Dr. C. M. Miller, of Richmond. Dr. Fletcher D. Woodward, of Charlottesville, is secretary-treasurer. This society now numbers about eighty members and the officers are anxious to have all Virginia doctors eligible for membership join them. An interesting program is being arranged. Dr. J. W. Jervey, of Greenville, S. C., is among the invited guests.

Dr. S. P. Hileman,

Recently of Lexington, Va., is now located at Millboro, Va.

The American Surgical Association

Will hold its annual meeting in Richmond, on May 12, 13 and 14. Dr. Harvey Cushing, Boston, is president, and Dr. Robert Greenough, Boston, secretary. This society has a membership of about one hundred and fifty members and a large number of these are expected at the Richmond meeting.

Relationship of the Physician to the Public.

A Primer on this subject was issued by the *Journal of the Medical Society of New Jersey* early this year. It is in the form of a "shorter catechism" on medicine and is both interesting and instructive. The Journal is to be congratulated on its excellent exposition of this subject.

Doctors Interested in Rappahannock Valley, Inc.

At the meeting of the Rappahannock Valley, Inc., at Tappahannock, Va., the latter part of March, the following doctors were among those selected as directors: Dr. H. A. Tabb, Gloucester; Dr. J. H. Lowe, Welcome, and Dr. F. W. Lewis, Morattico.

Protecting Babies From Blindness.

About sixteen years ago physicians in this country began the general practice of dropping a medicinal solution in the eyes of new-born babies in order to prevent ophthalmia neonatorum, or blindness resulting from eye infection at birth. The treatment is proving effective, for while 25 years ago one of every three children in the schools for the blind in the United States was blind from this cause, in 1926 the proportion had been reduced to about one out of every ten.

As an indication of the success which may follow special efforts by the health authorities, Maryland's two State schools for the blind reported not a single pupil admitted in 1925 who was blind from this type of eye infection. The State has made the disease reportable, like diphtheria or smallpox, and its board of health supplies the preventive solution to physicians free of charge.

Child-Bearing Need Not Be a Dangerous Occupation.

The New York Maternity Center Association takes care of pregnant women, and last year—1926—it was so successful in this work that not a single one of the 2,000 mothers cared for died as the result of childbirth. If this group had shown the same maternal death rate as that for the city in general, 8 or more of the 2,000 would have lost their lives. The association formerly gave care exclusively to poor women, but last year it offered its services to mothers of the professional and salaried classes and nearly 200 such mothers took advantage of them.

Dr. Conway Hiden,

Recently resident obstetrician and gynecologist at the University of Virginia Hospital, left April the 1st for Kentucky, where he went to accept a position as surgeon to the Consolidation Coal Company with offices at Burdine, Ky.

Virginia Working to Banish Diphtheria.

During the last six months of 1926, more than 35,000 children in this State were immunized against diphtheria, according to the State Board of Health, and a special drive for protecting the children is being undertaken by the Board, this year. For the first two and a half months this year, the number of completed immunizations was more than half of the total of last year. County medical societies and civic organizations all over the State are becoming interested in this protective work and are aiding public health authorities in organizing and conducting clinics, so that great advance in this work is counted on during 1927.

Dr. and Mrs. Victor C. Vaughan,

Of Michigan, have been on a visit to their son and daughter-in-law, Dr. and Mrs. Warren Vaughan, Richmond. Dr. Vaughan, for many years dean of the Medical School of the University of Michigan, but more recently a director of the National Research Council, has only recently returned from the Orient. While in Japan, he attended the Pan-Pacific Scientific Congress as representative of the Department of State of the United States and of several national organizations.

Dr. T. H. Massey,

Recently of Suffolk, Va., has located in Smithfield, Va.

The American Association for the Study of Allergy

Is to hold its fifth annual meeting in Washington, D. C., May 16 and 17—the first two days of the meeting of the American Medical Association—with headquarters at the Washington Hotel. Dr. Karl K. Koessler, of Chicago, is president, and Dr. Albert H. Rowe, of Oakland, Calif., is secretary-treasurer. An interesting program has been arranged and a subscription dinner will be had on the evening of the 16th, at which time Dr. Arthur F. Coca, of New York City, will be the speaker. All physicians interested in the subject of allergy are invited to attend the daily sessions and to be present at the dinner. Reservations for the dinner may be made through the secretary, Dr. Albert H. Rowe, 242 Moss Avenue, Oakland, Calif. A check of $4.00 for the dinner should accompany each reservation.

This association has only a small number of Southern doctors in its membership at present. The members in this section are Dr. Warren T. Vaughan, of Richmond and Drs. Harry S. Bernton and Grafton T. Brown, of Washington, D. C.

Care of New York's Crippled Children.

New York has recently organized a crippled children's bureau in its State department of education. This bureau is to maintain a register of all physically handicapped children (not including the deaf and the blind) and to devise a plan of co-operation among children's court judges, county officials, local school authorities, private and public agencies, and parents. On the order of the children's court, the counties are to be chargeable with the cost of the physical care and education of such children, but they will be reimbursed by the State for one-half such expenditure if the order is approved by the State commissioner of health.

"Sun-Babies".

The Federal Children's Bureau sometimes presents in the popular form of a "movie" the practical lessons learned during a long and painstaking investigation. Its latest film is called "Sun-Babies", in which a number of attractive toddlers do their "stunts" before the camera and show how Father Sun with his bright rays can straighten rickety legs and arms and backs which have become weak and curved because of poor food and lack of sunlight. And these interesting youngsters are no Hollywood heroes, but just ordinary children who were treated during a three-year study of rickets in New Haven, Conn. The picture tells graphically how the mother can give her baby sun baths whether she lives in a city apartment, in the suburbs, or on a farm. The terms on which the film may be loaned or purchased can be learned on application to the U. S. Children's Bureau, Washington, D. C.

The Virginia State Dental Association

Is to hold its fifty-eighth annual meeting at Virginia Beach, Va., May 9, 10 and 11, with headquarters at the new Hotel Cavalier. Dr. W. N. Hodgkin, of Warrenton, is president, and Dr. A. M. Wash, of Richmond, is secretary-treasurer. An interesting program to include both papers and clinics has been arranged.

Dr. E. W. Peery,

Formerly of Lynchburg, Va., will reside in Florida for a few years on account of the illness of his son. Dr. Peery is practicing his specialty, diseases of the eye, ear, nose and throat, at West Palm Beach, Fla.

Dr. Hugh S. Cumming,

Surgeon-General of the United States Public Health Service, will be the commencement speaker at the Medical College of Virginia at Richmond on Tuesday, May 31st. Doctor Cumming is an alumnus in medicine both of the University of Virginia and the Medical College of Virginia.

Dr. Clarence Porter Jones,

Of Newport News, Va., spoke on the work of Dr. Walter Reed before one of the women's organizations of that city, early in March.

Italy's Child-Welfare Work.

Courses for graduate physicians and for midwives on prenatal and postnatal care were opened in January by the National Bureau for Maternity and Infant Welfare of Italy. Di-

plomas showing satisfactory completion of the prescribed course will be required of all applicants for positions with institutions or agencies established or subsidized by the bureau.

Rome's municipal government has arranged to remove adenoids free of charge in the case of public school pupils needing the treatment. It has started a survey to discover all such children, and is undertaking a campaign to familiarize parents with the importance of having adenoids removed.

The Governor of Rome has decreed that special classes for mentally defective children shall be established in that city and be in charge of trained teachers. Pupils who prove delinquent or show no improvement after two years' attendance are to be placed in institutions, provision for which is also made in the decree.

Dr. Robert Hiden,

Of the class of '23, University of Virginia, Department of Medicine, formerly of Boston, Mass., is engaged in the practice of internal medicine in Washington, D. C., where he is associated with Drs. Sterling Ruffin and R. Massie Page, with offices at 1150 Connecticut Avenue.

Summer Clinics, Chicago Medical Society.

The Chicago Medical Society plans to have summer clinics this year and will be supported in this work by many of the largest hospitals in that city. In 1926 registrations were limited to physicians living in Illinois, but accommodations have been increased so that registrations will be open to physicians from other states, this year—as many as can be accommodated, in order of their registrations. The registration fee is $10 for each two weeks' course, payable at time of registration, and a physician may register for only one course of two weeks. The first course will be from June 13th through June 24th; the second will be from June 27th through July 8th.

Dr. V. W. Quillen,

Of Nickelsville, Va., is spending the months of April and May in New York City, where he is taking post-graduate work in medicine.

The Medical Society of the State of North Carolina

Will hold its annual meeting at Durham, April the 18th to 21st, under the presidency of Dr. John Q. Myers, of Charlotte. Dr. L. B. McBrayer, of Southern Pines, is secretary.

Deaths of Physicians in 1926.

According to the *Journal of the A. M. A.*, during 1926 it published the deaths of 2,677 physicians of continental United States. The average age of deaths published was 62.8 years. There were twenty-four deaths in the age period of 25-29, and 125 at or above 85 years of age. The largest number of deaths—389—occurred during the age period of 65-69. The largest number of deaths occurred in the month of March. Heart disease was the most common cause of death, cerebral hemorrhage was the second most frequent cause of death, with pneumonia, nephritis and cancer following in the order named.

Dr. Alexander G. Brown, Jr.,

Richmond, has been appointed one of the delegates from the Virginia Society of Colonial Wars to the triennial meeting of the general society to be held in May at Trenton, New Jersey.

Mexico Requires Diphtheria and Scarlet Fever Tests.

Before a child can enter public school or kindergarten in Mexico, the Federal government has ordered that he must be given the Schick test for diphtheria and the Dick test for scarlet fever. Preventive treatment is given in cases of positive reaction, and both tests and treatment are free of charge.

Interesting Statistics About Hospitals.

The sixth annual compilation of statistics concerning hospital service in the United States, as published in the *Journal of the A. M. A.*, states there are now listed in the United States 6,946 hospitals (excluding some not deemed worthy of publication), with a total capacity of 859,445 beds,—an increase of fifty hospitals and 22,869 beds in one year. These statistics show also that there are in the States 327,045 registered nurses, or about twenty-eight to every 10,000 persons, and in addition to these there is a large number of unregistered nurses, the total of which has not been ascertained.

Dr. Gladys Smithwick,

Recently of Roanoke, Va., who was to have left for China for medical missionary work, the last of February, has had her sailing indefinitely postponed because of the present state of affairs in China, and has accepted a position as assistant physician at the Western State Hospital, at Staunton, Va.

Dr. Rees Morgan,

An alumnus of the University of Virginia, after an absence of some months, has returned

there and will be an instructor in obstetrics and gynecology for the balance of this session.

Dr. William Patterson,

For the past several years of Richmond, is now located at Tampa, Fla.

Civil Service Examinations.

The U. S. Civil Service Commission, Washington, D. C., announces open competitive examinations for Junior Medical Officer (Interne), applications to be on file at Washington, D. C., not later than June 30, 1927; also for Graduate Nurse and Graduate Nurse (visiting duty), and for Social Worker (Psychiatric), applications for the latter positions to be rated as received at Washington, D. C., until June 30, 1927.

Applications for associate bacteriologist (medical) should also be on file with the Civil Service Commission at Washington, D. C., not later than May 10, 1927. This examination is to fill vacancy in the Hygienic Laboratory of the Public Health Service at Washington, at $3,600 a year, and similar vacancies as they may occur at approximately the same rate of pay.

The Paul Lawrence Dunbar Special School, Norfolk, Va.

In 1924 a special school for over-age pupils from the various colored schools of Norfolk, Va., was established and named in honor of the Negro poet, Paul Lawrence Dunbar. The pupils of normal intelligence who will probably have a chance to go to high school are given special coaching to that end. For the others the regular curriculum is supplemented, the girls being taught cooking, sewing, laundry work, and household management, and the boys carpentry and cobbling. The school also has an open-air room for children who are subnormal physically or show tendencies toward disease.

Dr. Philip S. Roy.

Washington, D. C., has been elected delegate from the Medical Society of the District of Columbia to the Washington meeting of the American Medical Association to fill the unexpired term caused by the resignation of Dr. William Gerry Morgan. Dr. Thomas A. Groover was elected alternate for the same period.

Dr. H. C. Henry,

Superintendent of the Central State Hospital, at Petersburg, Va., gave a talk at the bi-weekly assembly of the students of the Medical College of Virginia, March 31st, telling of the State's provisions for caring for insane patients.

Dr. Harry D. Howe,

Hampton, Va., with a party of friends from that place, is travelling in South America.

Dr. William C. Gibson,

Suffolk, Va., has been elected commander of the Suffolk Post, American Legion, for the coming year.

Eye Examinations for Preschool Children.

The National Committee for the Prevention of Blindness has manifested its interest in the preschool child by establishing in New York City three centers for examination of the eyes of children between 3 and 6 years of age. Varied methods of procedure are being used in the centers, so that at the close of the study different plans may be recommended to other agencies intending to begin such examinations.

For Sale—

Gosnold Sanitarium, formerly conducted as an institution for the treatment of Nervous and Mental Diseases by Dr. J. A. Strickland, Norfolk, Va. Terms reasonable, requiring only about $2,000 cash. For further particulars, write Dr. J. A. Strickland, 205 Medical Arts Building Norfolk. Va., care Miss Inez Murfee. (*Adv.*)

Doctor Wanted—

To take over established practice in small town and good rural community. All roads improved, good school. Would like to sell office and modern dwelling. Address "R. X.", care Virginia Medical Monthly. (*Adv.*)

Wanted.

An experienced woman assistant in laboratory, urological, X-ray, electric therapeutics, and secretarial work, desires position in doctor's office. Richmond location preferred. References furnished. Address No. 40, care this journal. (*Adv.*)

Obituary

Dr. Theodore L. Ginn,

Of Goldsboro, N. C., died suddenly in his office while treating a patient, on March 22nd. Dr. Ginn was forty-seven years of age and a graduate from the Medical College of Virginia in 1901. His death was due to apoplexy.